IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication MAY 18, 1961

Report From West Germany

Larry Williams

★ A Series of First-Hand Reports—

Germany's Industry: Growth, Problems p. 105

New Look at Continuous Casting p. 110

Airfoils Get Super Finishes p. 135

Digest of the Week p. 2-3

controlled microstructure eliminates extra finishing

High production items like these wrench sockets require steel of uniform chemistry, structure and hardness. SNAP-ON TOOLS CORPORATION specifies Aristoloy 8630. They report that uniform quality and predictable machinability mean less down-time for tool changes and the elimination of extra finishing operations.

Aristoloy *electric furnace* steels are no accident. They result from controlled melting of selected scrap, careful rolling, and precise heat treating. Bars and billets produced are of controlled hardness and microstructure.

Call your local Copperweld representative for complete information—or write for PRODUCTS and FACILITIES CATALOG.

ARISTOLOY STEELS

DIVISION OF
COPPERWELD
STEEL COMPANY

ARISTOLOY STEEL DIVISION 4001 Mahoning Ave., Warren, Ohio • EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

Behind your knowledgeable Steel Service Center stands the American steel industry's army of experts on selecting and fabricating steel sheets, plates, structurals, bars, alloy steels, and tool steels. What technical information do you need? Ask your Steel Service Center. Ask—you'll get a fast, intelligent answer.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM STEEL

Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL

THE IRON AGE, Chestnut & 56th Sts.
Philadelphia 39, Pa., SH 8-2000

IRON AGE

May 18, 1961—Vol. 187, No. 20

GEORGE T. HOOK, Publisher
TOM C. CAMPBELL, Editor-in-Chief
GEORGE F. SULLIVAN, Editor
E. C. BEAUDET, Managing Editor

News Editor — R. D. Raddant
Technical Editor — J. J. Obrzut
Art Director — T. S. Paaby

News Staff: H. R. Neal, Asst. News Editor; P. J. Cathey, J. D. Baxter, B. F. Surer, G. A. Mulligan, Associate Editors.

Technical Staff: R. H. Eshelman, Machinery Editor; R. R. Irving, Welding Editor; C. L. Kobrin, Metallurgical Editor; W. N. Redstreake, R. J. Radomski, Associate Editors; C. A. Lewis, Assistant Editor.

Iron Age Bureaus: K. W. Bennett, Chicago; T. M. Rohan, Cleveland; G. J. McManus, Pittsburgh; A. E. Fleming, Detroit; F. J. Starin—Nonferrous, New York; R. R. Kay, Los Angeles; G. H. Baker, R. W. Crosby, Washington.

Correspondents: F. L. Allen, Birmingham; N. Levenson, Boston; R. E. Koebbe, St. Louis; J. Miller, San Francisco; Scott Hayden, Buffalo; D. R. Coughlin, Seattle; A. T. Collins, Houston; F. Sanderson, Toronto; F. H. Harley, London.

Washington Editorial Office: Nat'l. Press Bldg. Washington 4 ..... EXecutive 3-3474

Business Staff:

Marketing Manager — R. H. Groves
Circulation Manager — W. M.Coffey
Production Manager — Warren Owens
Promotion Manager — D. B. Pollock
Market Research Manager — G. V. Shanno
Census Manager — William Laimbeer
Research Consultant — Oliver Johnson

Regional Business Managers
*Denotes editorial office also

Atlanta ..... J. W. Sangston
1776 Peachtree St., N. W. — 875-1255
*Chicago 1 ..... T. H. Barry, W. R. Pankow
360 N. Michigan Ave. — RAndolph 6-2166
*Cleveland 15 ..... C. B. Shaw, R. L. White, W. J. Devlin
930 B. F. Keith Bldg. — SUperior 1-2860
Columbus 15, Ohio ..... Harry G. Mumm
LeVeque-Lincoln Tower — CApital 1-3764
Dallas 6 ..... W. J. Smyth
189 Meadows Bldg. — EMerson 8-4751
*Detroit 2 ..... W. J. Mulder
103 Pallister Ave. — TRinity 1-3120
*Los Angeles — R. Raymond Kay
3320 Strand, Manhattan Beach — SPring 2-1819
*New York 17 — C. T. Post, I. E. Hand
100 E. 42nd St. — OXford 7-3400
*Philadelphia 39 — SHerwood 8-2000
B. L. Herman, J. A. Crites, W. E. Carr
*Pittsburgh 19 ..... T. M. Fallon
1707 Frick Annex Bldg. — ATlantic 1-1830
San Francisco 3 — Don May
1355 Market St. — UNderhill 1-1707
W. Hartford 7 ..... Paul Bachman
62 LaSalle Rd. — ADams 6-4237
London, SW 1 — A. T. Chapman-Purchas
67/68 Jermyn St. — St. James, TR 6318
Dusseldorf — M. F. Holsinger
Huttenstrasse, 17 — Am Ernst-Reuter Pl
Classified Adv. Sales — H. W. Bozarth
Philadelphia 39 — SHerwood 8-2000

J. H. Kofron — Chilton Research Director
Robert Gunning — Readability Consultant

Chilton Officers & Directors
G. C. Buzby, President

Vice-Presidents: P. M. Fahrendorf, L. V. Rowlands, G. T. Hook, R. E. McKenna; Treasurer: W. H. Vallar; Secretary: J. A. Montgomery; Directors: M. E. Cox, F. P. Tighe, E. B. Terhune, Jr., R. W. Case, Jr., C. A. S. Heinle, J. H. Kofron, G. E. Cameron, Comptroller, Stanley Appleby; Ass't. Sec'y., I. C. Holloway

Indexed in Applied Science & Technology Index and Engineering Index

Copyright 1961 by Chilton Company

The Iron Age, published every Thursday by CHILTON COMPANY, Chestnut & 56th Sts., Philadelphia 39, Pa. Second class postage paid at Philadelphia, Pa. Price to the metalworking industries only: $2 for 1 year, $3 for 2 years in U.S., Canada $10, all others $15 for one year. Latin America $25. Other Foreign $35. Single copies 50c. Annual Issue $2. Cable: Chilton Philadelphia.

Digest of the Week in Metalworking

News of the Industry

West German Growth Brings Some Problems: But fast pace continues. 105
Employee Training Job Grows: Automation forces shifts in plans. 108
How to Cut Handling Costs: Equipment makers unveil some new ideas. 109
Continuous Casting Faces Test: Steelmakers re-study its prospects. 110
Stamping Sales Stage Comeback: Continued gains are expected. 111
Super-Strong Shapes Go on Sale: Fill gap in super-strength market. 112
More Power at Memorial Day Race: Cars feature new developments. 123

Engineering-Production Developments

Vibrator Smooths Airfoil Parts: Polished blades extend engine life. 135
Stainless Steels Gain Strength: Subzero forming is the secret. 138
Electro-Spray Odd Shapes: Speed and versatility highlight new system. 141
Machining Hi-Temp Alloys?: Step-by-step controls can really pay off. 142
New Alumina Shapes Hard Steels: Also washes molds; improves paints. 144
Argon Teeming Enters Mills: Improves vacuum degassing of steel. 146

Markets and Price Trends

Steel Summary: Steel is off the bottom, and uptrend will continue. 183
Scalemakers Hope for Record Year: New orders better last year's pace. 184
Nonferrous: Copper prices continue upturn. How much is the question. 190
Auto Bumper Market Fight: Steel out to stop aluminum's inroads. 121
New Machine Tool Ideas Needed: Builders urged to study buyers' wants. 125

Editorial
Realities of Recovery:
Sobering Items Still Remain 5

Metalworking Newsfront
Business Forecast 7
Metalworking Labor 9
Washington 11
International 13
Techfront 15
Market-Planning Digest 103
Report to Management 119
Spacefront 133
Steel Summary 183

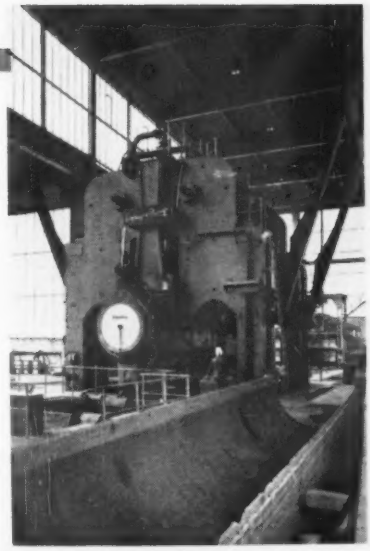
Industry Trends
Automotive 121
West Coast 123
Machine Tools 125
Purchasing 184

Markets and Prices
Price Section 183
Steel Products 186
Ferrous Scrap 188
Nonferrous 190

Departments
Letters 19
Fatigue Cracks 21
Meetings and Exhibits 23
Industrial Briefs 116
Men in Metalworking 126
New Patents 150
Technical Literature 153
Design Digest 156
New Equipment 170
Clearing House 200

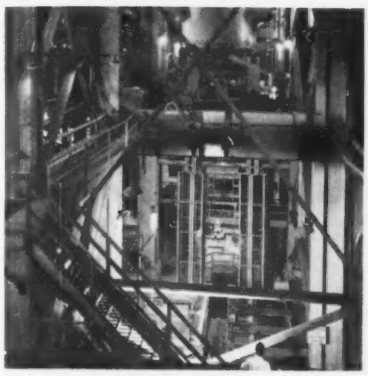
ADVERTISING INDEX 204

Special This Week



West Germany Has Growing Pains

West Germany's industrial explosion continues with few, if any, signs of slowing down. But the rapid post-war recovery has not been without its problems. In this first of a series of on-the-scene reports, Managing Editor E. C. Beaudet explores the German economy and the problems which challenge industry. p. 105



Continuous Casting Moves Ahead

Steelmakers are taking another look at continuous casting after dismissing it 10 years ago. For one thing, foreign experience has helped clear up earlier doubts. And new cost and marketing pressures have created the need for reevaluation. p. 110

Argon Teeming Produces Purer Steels

A dual-phase steelmaking development improves vacuum-melted steels. First, a vacuum-tight hopper top introduces additives into a ladle of molten steel. Then the steel is poured through a blanket of argon into sealed, argon-filled molds. p. 146

Next Week

Vacuum Metallurgy Scores New Goals

Long-time barriers to cheap atomic power are being swept away by a modified vacuum powder-metallurgy process. A new era of competitive atomic power is on the way. Next week's report tells how this process turns out ultra-pure exotic materials.

This 1850-pound forging will lose 80 pounds in the next 3 minutes. Finished, it will weigh 890 pounds and gage within .002". To hog metal like this without loss of accuracy, Cann & Saul Steel Co. uses a new 36" swing, 5-A Saddle Type Turret Lathe made by The Warner & Swasey Company, Cleveland.

W S

Realities of Recovery: Sobering Items Still Remain

The recession has passed bottom. Many economists believe the "recovery" will be rapid. Others think it will take time.

We agreed that this was a recession many months ago. We said then that it would take time to recover. But a few months ago we said much had to be done before real recovery came about.

Despite the cry for forced-draft optimism and for planned forgetfulness we remain cautious. Not about statistics though. They will record that the overall economy has started upward. But overall figures often hide painful facts.

The recession was mild for some lines, but quite severe for others. The latter will show the fastest and biggest improvements. The lower you go the better it looks—percentagewise—when you start to recover. That applies to steel, aluminum, copper, freight car loadings, appliances, stampings and a host of endeavors which were hit hard for the past year or so.

Part of the recovery is a reversal of inventory practices. More people will buy for inventory. That will up production, increase carloadings, step up raw material procurement and lift the economy generally.

Part of this will be due to labor trouble fears and part to seasonal factors. Part will be due to the new type of short-but-often cyclical ups and downs in the business picture.

Tough realities remain. There are many. Profits build our economy and keep it going to new heights. But earnings are far from enticing. Complete recovery here is so-so.

Prices furnish the base for profits. They are sticky. World competition and domestic ardor to get the order keep them down. Washington pressure and a long-term down-trend have combined to dampen prospects of higher prices. That's disheartening to those who depend entirely on prices—instead of new products, ingenuity and cost cutting—to shape their future plans.

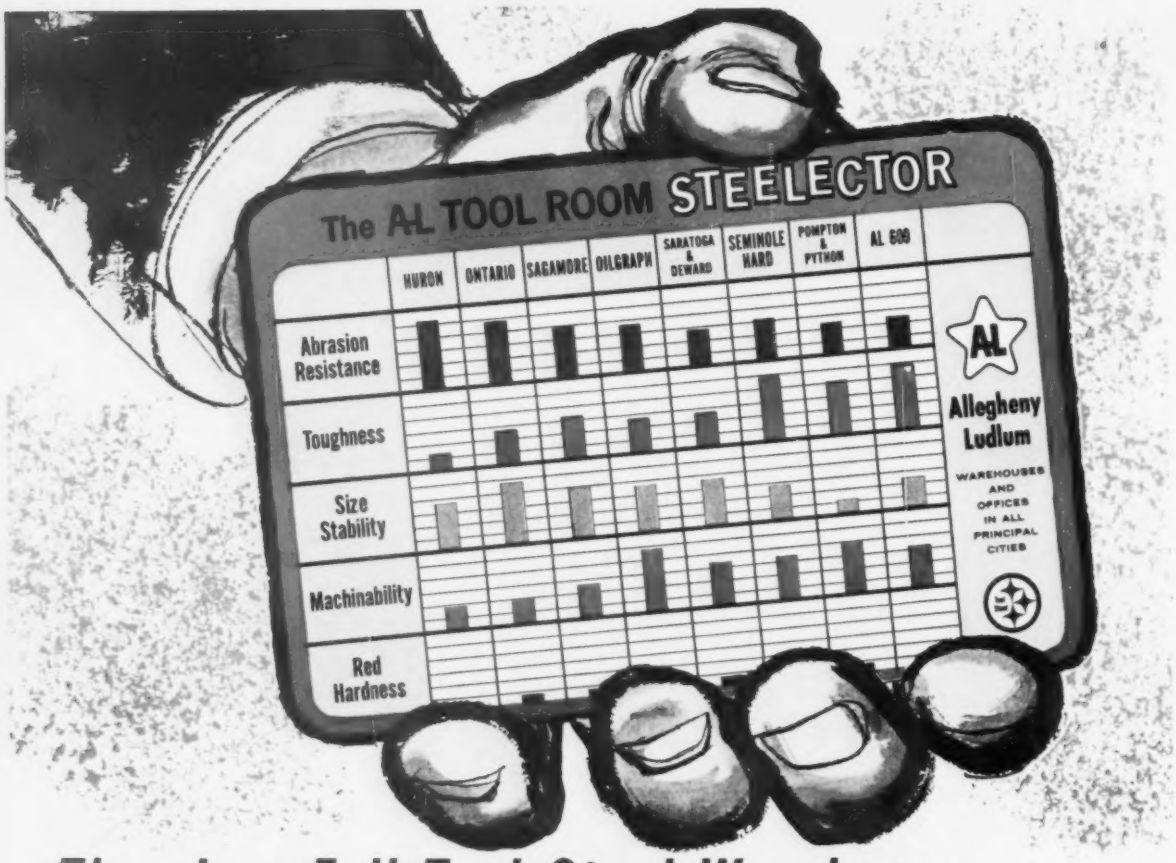
Government will cut back tax deductions for public relations reasons. Taxes may be raised to take care of a new limited-warfare apparatus. Business will be harassed at times. And there may be wage and price controls in a few years.

In this "recovery" there is nothing to cause executive officers to throw away their tranquilizers and drop off to sleep—naturally.

As a matter of fact there will be little sleep in the business camp for many a year—if ever!

Tom Campbell

Editor-in-Chief



There's a Full Tool Steel Warehouse
Behind the A-L STEELECTOR Cards!

The pocket-size STEELECTOR Cards represent a full tool steel warehouse—full of the grades and shapes and sizes.

Each STEELECTOR Card (there are cards for hot work, high speed, and tool room applications) uses bar graphs to show how the STEELECTOR grades compare in abrasion resistance, toughness, size stability, machinability, and red hardness. In a glance you can select the grade with the best combination of properties for virtually any job.

And when you select a STEELECTOR steel, you know beforehand that it is quickly available. Warehouse supplies have been increased because of the widespread usefulness of STEELECTOR grades.

A Data Stock List for each STEELECTOR grade gives you additional information—to help you make sure that the steel fits your job exactly. The steel's properties are described and the proper hardening, tempering, and annealing temperatures are given along with the steel's analysis and AISI number. A list of typical applications together with suggested working hardnesses serves as an additional check on your use of the steel.

The Data Stock List also tells exactly what sizes and shapes are in warehouse stock. You know before you order that the tool steel you choose is ready for prompt delivery.

By using STEELECTOR grades, you can save storage space in your own plant. You can reduce the number of grades you stock. And you can rely on fast off-the-shelf delivery in case your own stock runs low.

For more information on the STEELECTOR system, ask your Allegheny Ludlum representative for your copy of the colorful, 10-page STEELECTOR Booklet, or write: ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pennsylvania.*** Address Dept. A-5. READ

STEELECTOR PROGRAM

ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country

Recovery: Sharp or Gradual?

Now that the recession is ended, the big question is: How sharp will be the recovery?

Most economists and executives think the upturn will be a gradual one. But the "sharp upturn" school has its following. Two examples:

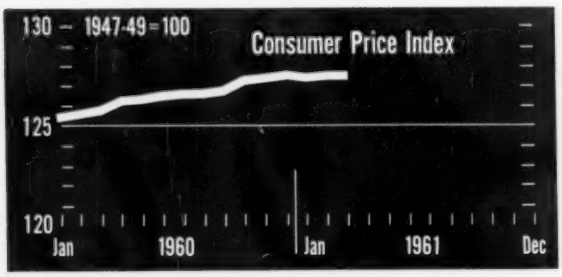
A team of Indiana Univ. business and economic forecasters predicts a "sharp and vigorous upturn" on the immediate horizon. They see a fourth-quarter GNP of $537 billion, up $37 billion from the first quarter.

And in steel, T. F. Patton, Republic Steel Corp. president, sees rising shipments in the second and third quarters "setting the stage for a sharp upward pattern" in the fourth quarter, and in the first quarter of 1962.

Consumer Prices Hold Firm

For four straight months consumer prices have stayed level. The price index for March was 127.5 (1947-49=100), the same as for February.

Despite the stability of this price index, there is a general feeling that prices may be at a crossroad, or at least ready for a test. Two special forces are working towards loosening consumer prices from their



four-month moorings: Better business and still-gaining labor costs.

An indication that prices may hold a bit longer: Wholesale prices for industrial commodities actually showed a slight decrease through week ending May 2.

Some Stock Building Overdue

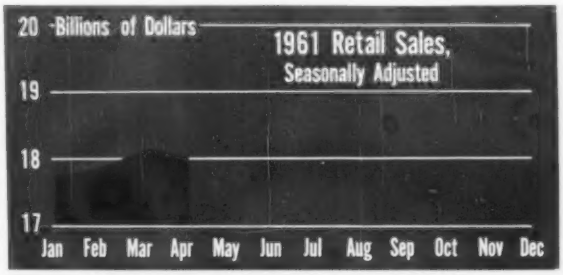
The recession has proved the importance of inventories. The popular view now is that manufacturers will keep close tabs on their stocks. The story goes: Computers, high costs of storing material and a need for cash will bring a new era in inventory control.

It's true that less inventory is being carried. But buildup of stocks of basic materials can still be expected later this year.

Among the buildup items: Coal, coke, iron ore, scrap, steel, aluminum, copper. All these items, except iron ore, have been far below so-called normal levels in the past year. Iron ore was built up in expectation of a steel boom that busted.

Retail Sales Dip in April

Retail sales in April fell about 1 pct below March. April sales, seasonally adjusted, amounted to $18 bil-



lion compared to March sales of $18.1 billion. Also, April sales were about 5 pct under year-ago levels.

"Most major lines," says Commerce Dept., had lower sales in April. But the setback is believed to be only temporary. Poor weather still plagued many sections of the country in April. And the healthy sales rise in March had temporarily filled shoppers' baskets.

Significant jumps in retail sales probably won't come until more jobless are absorbed in the recovery.

Industrial Production Up

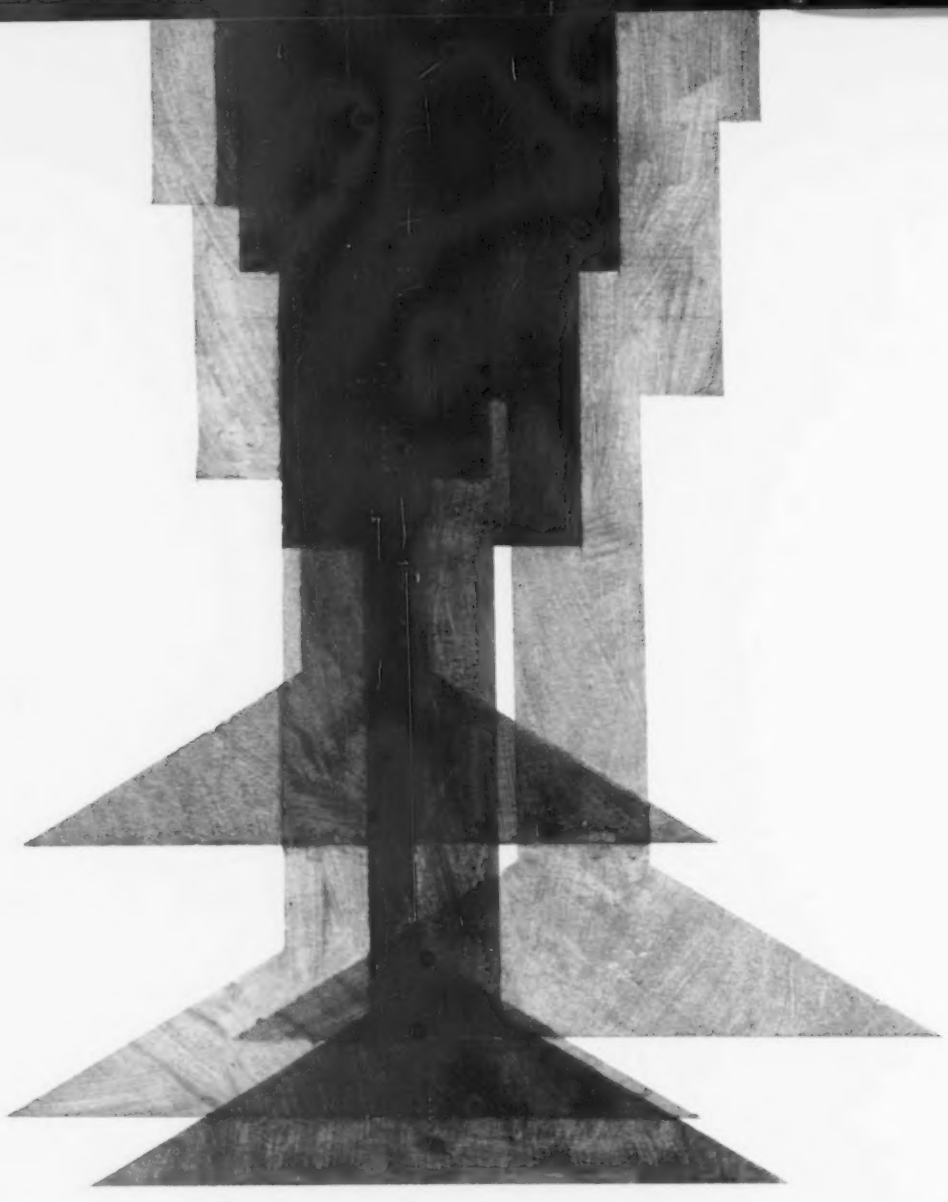
The recovery has been confirmed now by one of the most important of all indicators—and in a strong way. Industrial production in April rose 25 pct over March to 105 on the Federal Reserve Board index (1957 = 100). Autos and steel led the advance, but gains were made across the board with durables production up 4 pct.

Jobless Level Blights Upturn

One shadow is cast across the face of the general recovery—long-term unemployment. It climbed to a post-war peak of 2.1 million last month. Nobody expects employment recovery just yet. But the danger sign is in growing evidence a high jobless level will linger.

A late April Dun & Bradstreet survey of 1537 executives shows that 67 pct see a further upturn in the third quarter. But 82 pct expect this "without adding to their workforces."

And the President's chief economic adviser, Walter W. Heller, says that even if GNP rises to $525 billion by next winter, the nation still must expect a jobless rate of 6 pct.



Improved Kaiser Permanente 84 Ramming and Patching Mix

BOND STRENGTH SIX TIMES GREATER!

From steel-making surface down to hearth brick . . . from cold start-up to operating temperatures . . . improved Permanente 84 rammed bottoms and patches have dramatically greater bond strength. ■ The table below shows cold crushing strengths up to six times greater for new Permanente 84—developed from one end of the critical temperature zone to the other. These strengths are achieved without sacrificing refractoriness under load. Permanente 84 goes directly from strong chemical bond to strong ceramic bond. High density is preserved throughout for greater protection against penetration, erosion, impact, and thermal shock. ■ For information and new technical folder about improved Permanente 84—or its companion Permanente 165 ramming mix—contact your Kaiser Sales Engineer, or write Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. □ □ □ □ (Canadian subsidiary: Refractories Engineering & Supplies, Ltd.)

COLD CRUSHING STRENGTHS:

TEMPERATURE	OLD 84	NEW 84
300° F.	1500 psi	9000 psi
480° F.	1740 psi	8500 psi
840° F.	1395 psi	9030 psi
1200° F.	1925 psi	10050 psi
1560° F.	1700 psi	10750 psi

KAISER REFRACTORIES

ACT APPLICATION CONSULTING TEAM: created to achieve greater refractories economy and efficiency. Ask for free booklet.

OAKLAND 12, CALIF. . . . . 300 Lakeside Drive

MEXICO, MISSOURI . . . . . Mex-R-Co Building

PITTSBURGH 22, PA. . . . . 3 Gateway Center

UAW: Talks to Open With Ford on June 29

UAW and Ford Motor Co. will begin contract negotiations June 29, Chrysler Corp. on June 30.

The dates are slightly ahead of the July 1 date which technically is 60 days prior to expiration of current contracts. The advances were made because July 1 falls on a Saturday, and in order to get a start before the July 4 holiday.

A definite date hasn't been set yet for General Motors Corp.'s opening meetings. It will start the last week in June or the first week in July, however. Negotiations will begin in July at American Motors Corp. and Studebaker-Packard Corp.

USWA: Is Next Angle To Blast Management?

Management featherbedding is charged by Ben Fisher, director of arbitration for the United Steelworkers of America. He says industry uses a double standard in calling waste motion by plant workers sinful while permitting "fantastic layers of useless supervision" and "teams of memo writers."

MINE-MILL: Opens Talks With Kennecott

Kennecott Copper Corp. was hit with a bundle of demands from the Mine, Mill and Smelter Workers Union as the two opened negotiations on new labor contracts. Contracts at three of the company's four Western mining divisions expire June 30.

Demands fall into the pattern outlined by other major unions as their goal this year, with Emphasis on security:

A 32-hour week at 40-hours pay;

A substantial, but unspecified, wage increase;

Higher supplemental Unemployment Benefits;

Improved health and welfare benefits;

Retirement at 65 years of age instead of 68;

Elimination of remaining pay differentials between divisions.

Kennecott is the only major copper producer with Mine-Mill contracts expiring this year. However, its settlement is usually the pattern for other unions having contracts with the company. Two years ago the company and union reached an agreement only after a six-month strike.

UAW: Auto Buildup Puts It Behind 8-Ball

Automakers will have built up dealers' inventories of current model cars before labor contracts expire Aug. 31.

In a way, this puts the United Auto Workers and chief negotiator-president Walter P. Reuther a little further behind the eight-ball. Automakers can afford to take a strike until inventories are depleted.

Plan Curb on Missile Strikes

Labor slowdowns in the nation's missile programs are due to be halted by government action. A Presidential order was expected this week on what action to take to assure full-speed construction of missile launching bases.

Secretary of Labor Arthur Goldberg, after meeting with government, labor and industry officials, has recommended to President Kennedy a specific program to rid the construction sites of strikes.

The program includes creation of a panel similar to the old War Labor Board to settle union disputes at missile bases. The plan could include a no-strike pledge by unions, but the Administration is not pushing for this.

Under the labor panel plan, all parties involved in missile construction disputes would submit arguments of every type to a board for settlement.

This is much like the War Labor Board operation in World War II. In the missile program, however, union rivalries rather than disputes with employers have caused most delay.

Slowdowns have thrown the space flight program six months behind schedule, according to testimony before Senate investigators. More than 163,000 man-hours have been lost due to walkouts in four years.

The crux of the problem appears to be the insistence by the building trades unions that their jurisdiction covers all missile base work right up to the point where the missile is installed and ready to fire.

Industry men testified that their own technicians could do much of the work faster, cheaper and better. But to avoid costly strikes, they said, they allowed the local building trades to do the work.

Building Trades leaders deny that unions are responsible for the major delays in construction of the bases.

MORE THAN 100 P-A VENTURI GAS WASHERS NOW OPERATING IN THE STEEL INDUSTRY

Efficiency and economy proven for blast furnaces, open hearth furnaces, oxygen steel converters, electric furnaces and sintering plants.

Chemico venturi washers offer the following major advantages: low initial cost; virtually no maintenance; minimum space required; cleaning efficiencies approaching 100% can be obtained; adjustable controls maintain maximum efficiency at all rates of flow; recirculation minimizes water consumption; solids can be recovered in dry condition; and, power requirements on venturi washers are as low or lower than precipitators for open hearth furnaces and oxygen steel converters.
If you are considering the purchase of gas cleaning equipment, let Chemico show you how venturi washers are performing at steel plants from coast to coast.

CHEMICO

Chemical Construction Corporation, Gas Scrubber Division
320 Park Ave., New York 22, New York
Ferndale, Mich.
Chicago, Ill.
Los Angeles, Calif.
Houston, Tex.
Bartow, Fla.
Birmingham, Ala.
Pittsburgh, Pa.

★ Conventional Arms Needed

Metalworking industries involved in defense production should pay close attention to the greater emphasis being put on conventional weapons for fighting limited wars. It will have great impact on defense spending.

Though they seem outdated by modern missiles and nuclear arms, conventional weapons will be around for a long time. It is part of the "Be-prepared-for-little-wars" policy of the Administration.

The weapons will be improved. Examples are: the four-man submarine being developed by the Navy or the helicopters being ordered by the Army which can transport 33 soldiers or carry three tons of cargo. But the point is that subs which are not nuclear and aircraft which are not missiles will still be a big part of defense contracting.

Congressional budgetmakers warn that missiles are not yet the only weapons of war.

While approving the largest authorization in history for aircraft and Naval vessels, both the House and the Senate recenty made it clear they are not abandoning conventional weapons for missiles.

The $12 billion plus construction budget for next year calls for more than $5 billion for planes, about $4 billion for missiles and about $3 billion for ships.

Lawmakers gave substance to their warning by voting to continue construction of bombers which was scheduled to halt this year.

■ Antitrust Probes Face Some Opposition

Opposition to Congressional antitrust investigations is being heard from some lawmakers.

Sen. Everett Dirksen (R., Ill.), Senate Minority Leader, and Sen. Roman Hruska (R., Neb.), criticize the actions of the Senate Antitrust Investigations Committee of which they are members. They say:

"American industry is not on trial. Casting about for ways and means to degrade it or vilify it is not only grossly unfair but in violation of the subcommittee's function and purpose."

Conservative leader Sen. Barry Goldwater (R., Ariz.), charges that the "most dangerous demagogues in this country" are those who, under the guise of antimonopoly crusades, attack successful businesses "simply because they are big."

Sen. Goldwater does not mention the Senate Antitrust Subcommittee by name. But the implication is there. "If the destruction of bigness in itself becomes the objective of the monopoly investigations and legislation," he warns, "then we are aiming at our own destruction."

■ Regulatory Agencies Face Reorganization

Reorganization of Federal regulatory agencies is getting underway. Congressional and Administrative action is past the planning stage.

Hearings in Congress begin next week on agency changes. The House Government Operations Committee will start out with hearings on the Securities and Exchange Commission, Federal Communications Commission, and Civil Aeronautics Board.

House Commerce Committee hearings will begin June 6 on a bill to do away with ex parte influences by private interests on the regulatory agencies.

A plan to speed up the workings of the Federal Trade Commission was put before Congress by President Kennedy recently.

■ Congress May Start Strategic Minerals Hunt

Congress may authorize the Secretary of the Interior, Stewart L. Udall, to survey all government-owned land in a search for strategic minerals.

The 10-year survey is suggested by Sen. Lee Metcalf (D., Mont.) He says the survey would cover all Federally-owned lands, including

UDALL: Mineral seeker.

reserve lands and those subject to the mineral leasing and mining laws.

■ New Buying Power

Responsibility for purchase of all nonmilitary supply items will be transferred from the Defense Dept. to the General Services Administration, the government's housekeeping agency.

END RUST PROBLEMS FOR GOOD

USE STEELGARD

Reg. U.S. Pat. Off.

RUST PREVENTIVES

For Any Metal . . . For Any Length of Time For Any Application . . .

STEELGARD is a *whole family* of rust preventives built to protect your metals in almost any situation where corrosion may be encountered. Each STEELGARD is different because problems and plant requirements are different.

You may want:

- **protection for several hours or many years**
- **a dry, visible or invisible coating**
- **an oily but easily removable coating**
- **application to oily or wet surfaces**
- **protection for indoor or outdoor storage and shipping**

Whatever the situation, our technical men can recommend a STEELGARD that will protect your metal and your pocketbook, too.

STEELGARDS are used as received or diluted with water, mineral oil, or solvents for extra thrift. The water phase method protects while the metal is wet, drying or dry. It is water soluble only upon application and the dry coating prevents oxidation and rust.

This tremendously versatile family of rust preventives has racked up many remarkable problem-solving and money-saving case histories, as indicated to the right, and we would appreciate the opportunity to discuss your corrosion problems.

Write, wire or call and let us show you how STEELGARD can save you money over your present method and give you better rust protection.

SOME **STEELGARD** CASE HISTORIES

Light Gauge Stampings Protected, Painted Over Without Removal of STEELGARD

Parts were tested with other rustproofers, stored for days to weeks prior to painting. Only STEELGARD dried completely enough to allow painting without removal or affecting the paint.

Prevents White Rust on Galvanized Pipe

Galvanized pipe shipped to seaboard ports corroded fast. STEELGARD now keeps it bright and rust-free, leaves dry invisible film.

Metal Mold Protection

Steel or cast iron molds used in the glass, rubber or plastics industry were protected with oils and vaselines. Messy handling, dirt attraction and difficult degreasing were done away with by changing to STEELGARD which cost less and protected longer.

Rustproofing Hot Rolled Steel Nuts

Former oil caused skin rash and rust developed in a matter of days. Changed to STEELGARD, one or two minutes immersion. Entire shipment of nuts and bolts stays perfectly rust-free.

HARRY MILLER CORP. HAMICO 4th & BRISTOL STREETS PHILADELPHIA 40, PA

Manufacturers of
HAMIKLEER, ACTIVOL, HAMICOTE,
STEELGARD, IMMUNOL

HARRY MILLER CORP.

Original Products and Processes Since 1936

4th and BRISTOL STS., PHILA. 40, PA.

DAvenport 4-4000

Service Representatives in Principal Cities

Government Programs: Aid to Exporters?

The international trade negotiations at Geneva point up the seeming paradox of U. S. trade policy. With one hand the government helps the American exporter; with the other hand it hinders him.

At the Geneva meeting of the General Agreement on Tariffs and Trade (GATT), the government, while seeking concessions for our exports, must offer concessions for exports of foreign products to the U. S.

Other government programs are contradictory as far as U. S. exporters are concerned. For instance, while the government is spending millions of dollars on an export expansion program, it is also seeking to foster the European Trade Community at the expense of American exports.

Foreign "trade," by its very nature, cannot be a one-way proposition. And though U. S. policy is bound to help and hinder American exporters at the same time, the emphasis appears to be on the helping hand.

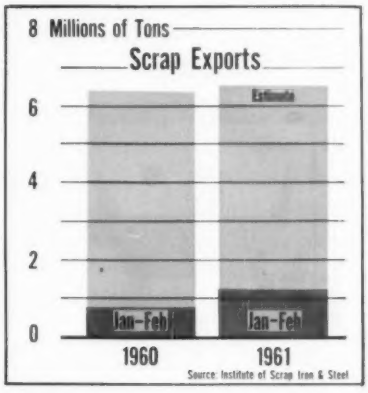
Scrap Exports May Taper Off Slighty

Foreign demand for U. S. scrap is now at a record level. But there's a good chance that demand will ease as the year wears on.

Iron and steel scrap exports hit 1.2 million tons during January and February. Shipments overseas during the same two months last year were 728,000 tons. Though March figures are just now being tabulated, estimates call for a slight increase over March, 1960.

However, William S. Story, executive vice president, Institute of Scrap Iron & Steel, told The IRON AGE: "Total export tonnage this year should just about match last year."

Earlier predictions had called for nearly 7 million tons of scrap exports in 1961. Mr. Story says this estimate is a "bit optimistic."



Total tonnage in 1960 was 6.4 million tons. Overseas shipments this year will probably reach this figure and maybe climb a little higher.

Balance of Payments Still Faces Hurdles

The U. S. balance-of-payments problem has been easing somewhat in recent months. But some international trade experts warn: The second half of 1961 will really tell the story.

The American dollar deficit in international transactions hit $3.8 billion in both 1959 and 1960.

But now the trend of increasing exports and decreasing imports has continued into 1961 prompting forecasts of an export surplus of $6 billion this year.

However, the Trade Relations Council of the United States notes: "Such optimistic forecasts are based only on actual January and February figures and estimates through June. The second half of 1961 may spoil this rosy prospect.

"If the U. S. economy improves and that of Europe levels off, as seems likely, our import trade would benefit and our export trade lose."

Similar feelings are expressed by the Federal Reserve Bank of New York: "In part, the sharp rise in 1960 exports reflected the boom in industrial countries abroad; and the slow contraction of imports, the developing slack in the U. S. economy.

Dollar May Face Devaluation Yet

Rumors of dollar devaluation have been killed by the U. S.'s firm stand. But some European industrialists feel the same end result may still be achieved.

These orthodox economists claim the currencies of major trading countries must be brought into better balance. They urge: (1) Up-value of the German mark by another five pct; (2) up-value of the Italian lira; and (3) de-value the British pound.

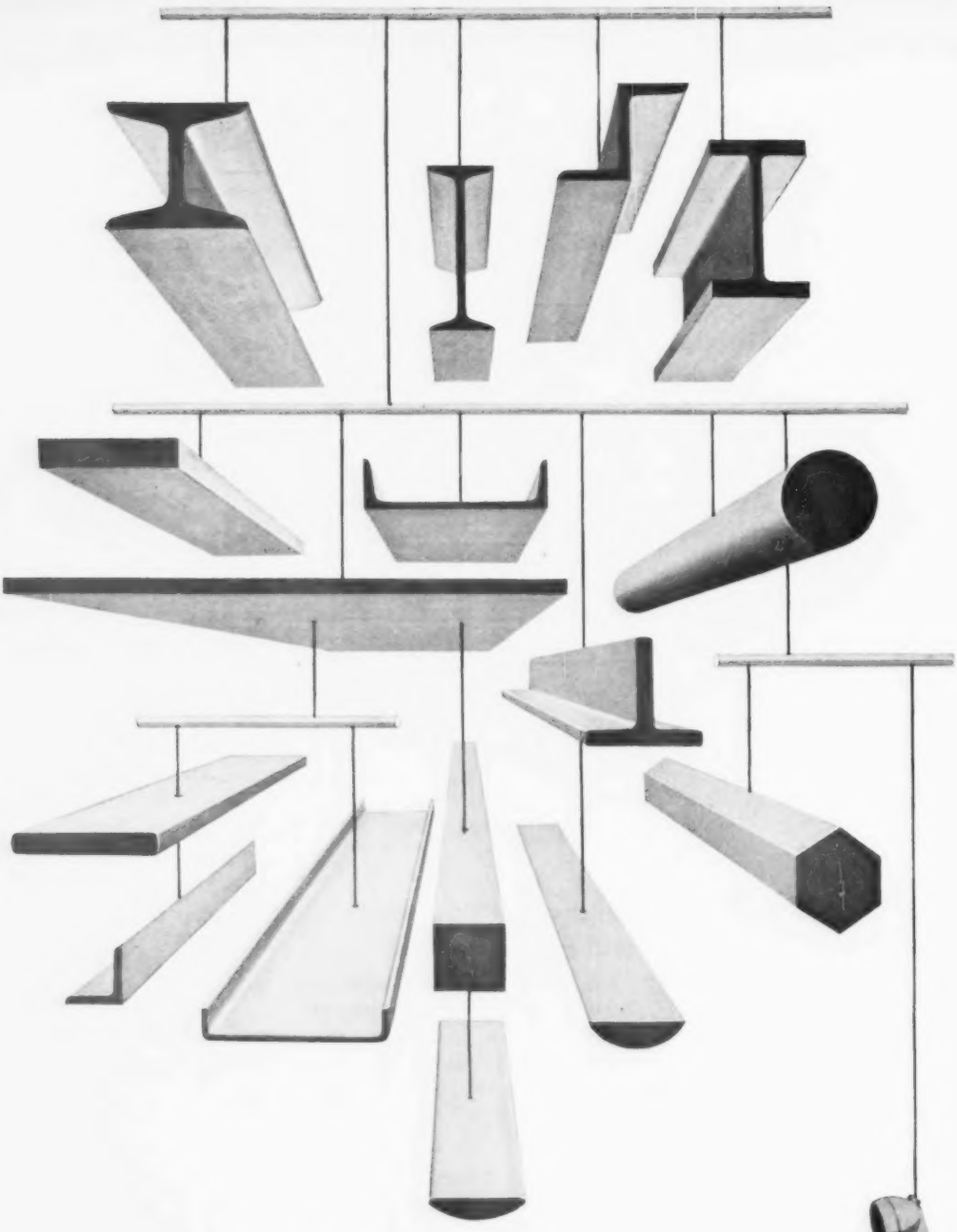
The first two steps would, in effect, cause devaluation of the dollar without boosting the price of gold.

German Labor Gap Affects Tool Deliveries

German builders of heavy machinery and machine tools still quote delivery times of 18 to 22 months. This is the same situation existing a year ago.

U. S. builders have booked some large orders and are surprised the backlog status has remained the same so long.

Today, there aren't too many predictions on when German backlogs will drop. This is because there is a new factor at work in Germany: Not only is the labor shortage as tight as ever, but workers refuse to work more than 44 hours weekly.



Call any one of 20 Ryerson service centers for bars, shapes, structurals and plates. No one comes close to equaling Ryerson stocks of hot rolled carbon steels in shapes, sizes and tons. And no one equals Ryerson quality controls and cutting accuracy. So be Metalogical—call Ryerson.

RYERSON

JOSEPH T. RYERSON & SON, INC., MEMBER OF THE INLAND® STEEL FAMILY

METALOGICS

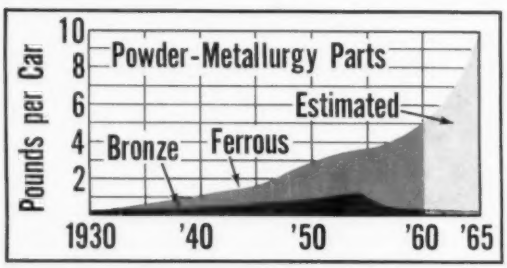
PLUS VALUES IN STEEL • ALUMINUM • PLASTICS • MACHINERY

Bubbles Analyze Aluminum

Small gas bubbles emerging from a cup of molten aluminum will lead the way to top-quality castings. This bubble test pinpoints the gas content of an aluminum melt. Operation is simple. A molten-metal sample is taken from the furnace and placed in a special heater. Then a vacuum-release valve is closed. When the vacuum pump is switched on, hydrogen content is gaged by noting when the first bubbles rise to the surface.

Powdered Metals in Autos

Nonferrous self-lubricating bearings once made up the major portion of the powdered-metal parts



used in cars. Now, however, powdered ferrous metals far outstrip their forebearers. The average 1961-model passenger car uses 6-7 lb of powdered-metal parts. These parts serve in gears, cams, levers, bushings and electrical systems.

Six-Second Shrink Fit

Pressurized air heaters permit localized heating for shrink fitting odd-shaped parts. These heaters supply a high-velocity discharge of hot air at controlled temperatures. They can turn out a million Btu per hour. Temperature range is 100°-3000°F. One company uses these compact heating units to shrink fit complex ringed assemblies. Output is 10 assemblies per minute.

Steels Too Pure?

Silicon steels can be too clean. That's the word from a leading steelmaker. Preliminary tests show vacuum degassing improves yields while handling final carbon removal. But a big problem has cropped up in developing the orientation needed for electrical properties. Technical men say it looks as though a certain amount of foreign matter is a must in the silicon alloys.

Protects Stored Parts

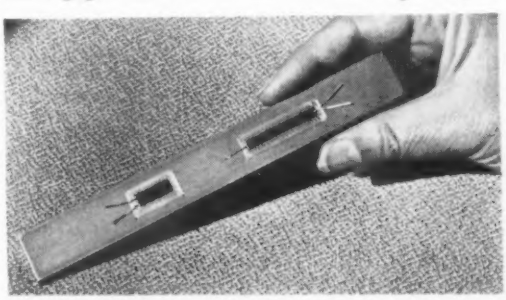
One of the newest volatile corrosion-inhibitor oils consists of a lubricating vehicle and a contact-type vapor producer. The lubricating vehicle produces good results by itself. And the vapor-phase component in this VCI oil offers a steady supply of long-lasting rust-inhibiting vapors. Uncle Sam uses these nontoxic vapors to protect stockpiled war equipment and machine tools.

More Electron-Beam Uses

The future looks brighter for the electron-beam technique in both welding and machining. Greatest potential hinges on the field of micro-miniaturization. To keep pace with production demands, Hamilton Electrona Inc. has already made plans to triple the speed of its worktable. This will boost commercial welding speeds.

Weldable Strain Gages

Providing stability from cryogenic through 750°F temperatures, a new line of strain gages can be spot welded in installations where shutdown time is at a premium. Small and rugged, these gages are free from local buckling. They're



NO CURING: Mounting shims speed installation.

made in two basic types. Phenolic-bonded foil gages measure stresses and strains at heats up to 500°F. Ceramic-bonded Nichrome-foil gages yield continuous readings up to 750°F. The latter gages also monitor short-term tests at 1000°F.

Announcing

A Major "Break-Through" In Cutting Fluid Performance

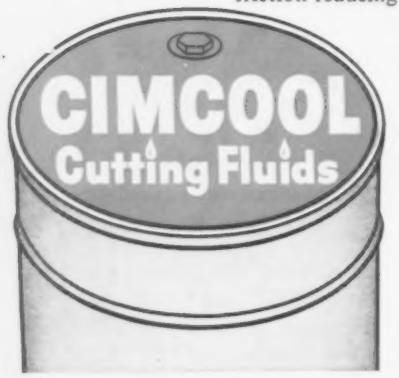
FIVE-STAR

★ ★ ★ ★ ★

CIMCOOL

From the Research Laboratories and Production Proving Grounds of Cincinnati Milling Comes This Remarkable New Product With These Proven Advantages:

1. **TROUBLE-FREE.** At lean, low-cost dilutions, Five-Star CIMCOOL goes into your machines and *stays put with no problems!* It lasts a long time and is extremely dependable.
2. **NO ODORS.** New bactericides keep Five-Star CIMCOOL in operation *four to six times* as long as other fluids.
3. **EXCEPTIONAL RUST PROTECTION.** Two different types of rust inhibitor in this *single-mix* concentrate provide up to 300% more rust control. This rust-control ability permits leaner dilutions, saves you money.
4. **CLEAN AND SAFE.** Five-Star CIMCOOL is just as clean as fresh, clear water to work in. It feels, smells and looks good. It will not smoke or catch fire. Good reasons why operators like it.
5. **LENGTHENS TOOL LIFE.** Production tests prove this new concentrate is second to none in providing *non-stop production*, because of its exclusive CIMCOOL EP, friction-reducing chemicals.



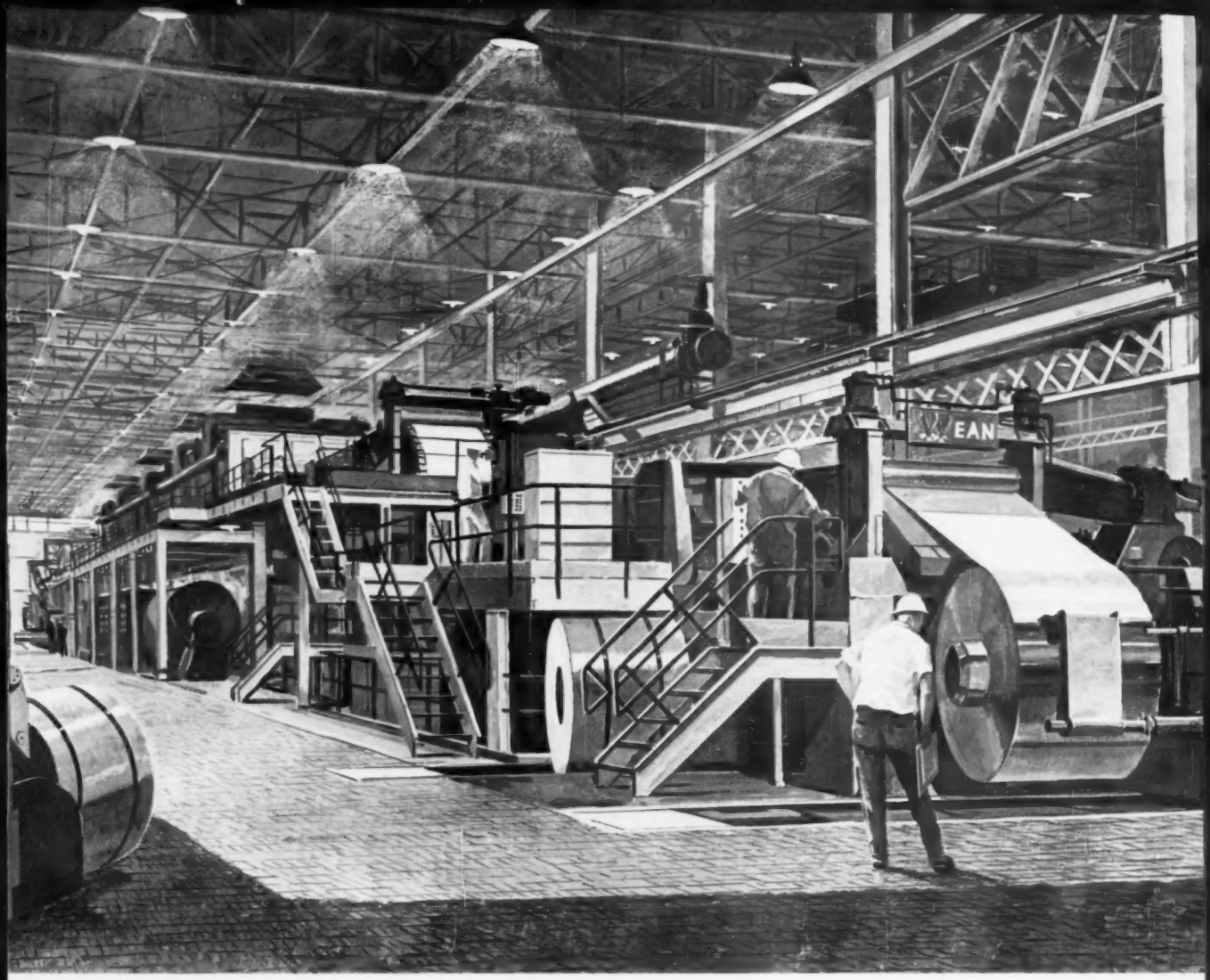
FOR 100% OF ALL METAL CUTTING JOBS

Production-Proved products of The Cincinnati Milling Machine Co.

FIVE-STAR CIMCOOL—Newest in the industry-proven line of CIMCOOL® Cutting Fluids.
CIMPERIAL®— Heavy duty replacement for cutting oils in those low-speed tough jobs.
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

®Trade Marks Reg. U.S. Pat. Off.



PORTRAIT OF PROGRESS: *Wean Annealing and Pickling Line at Armco Steel Corporation's Butler Works*

Wean Line Part of Armco's Expansion into Wider, Closer Tolerance Stainless

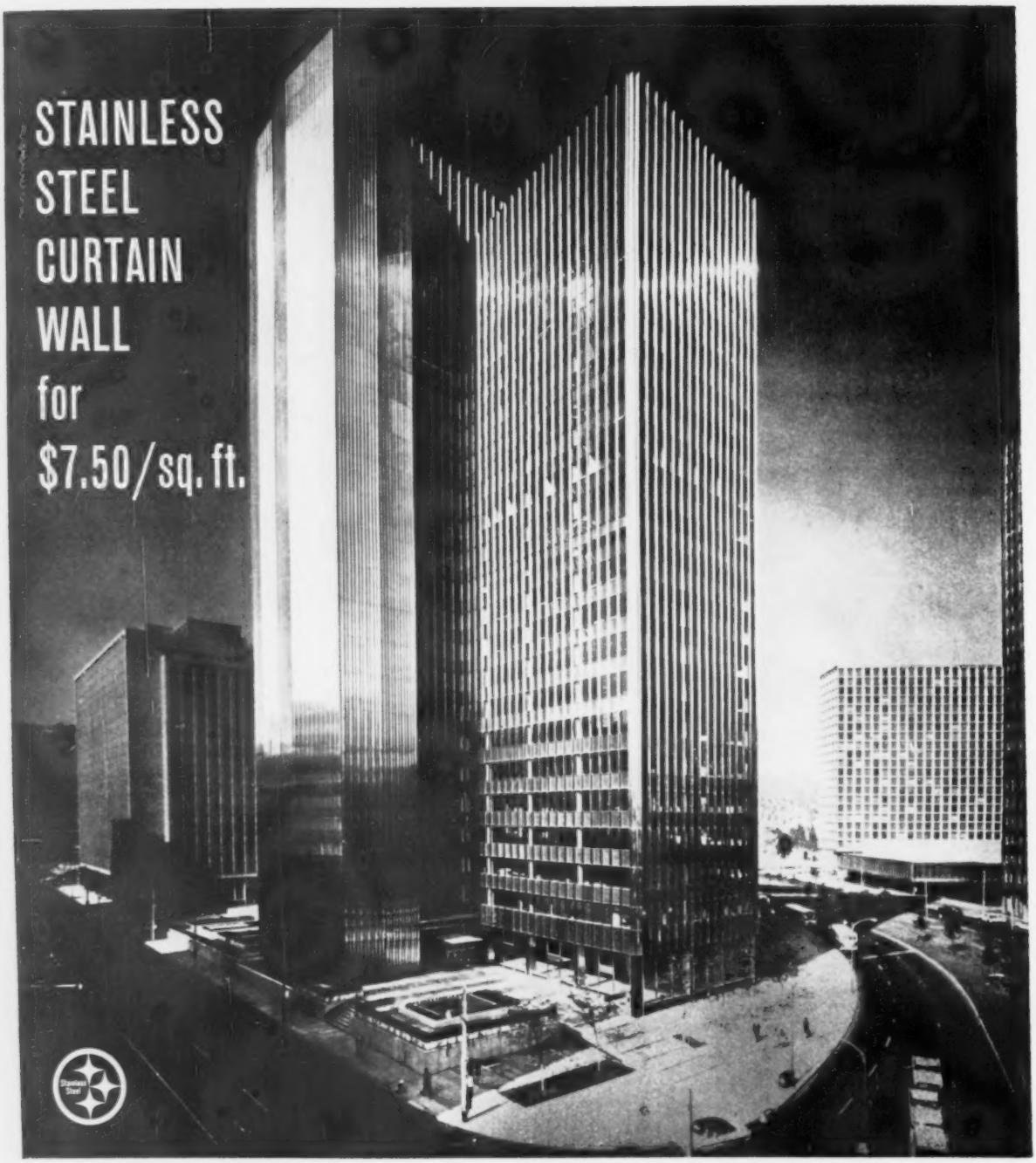
Over the past ten years, Armco Steel Corporation has carried on a multi-million dollar expansion and modernization of its Butler, Pennsylvania plant facilities. One of the latest projects boosts the plant's production of flat-rolled stainless steel, providing customers with wider, closer tolerance stainless sheet and coils.

A vital part of this program is represented by the Wean stainless annealing and pickling line illustrated. This line is unique, in that all processing sections are installed above floor level. Above-ground design facilitates inspection and maintenance of the furnace section, acid tanks, and drive mechanisms.

Armco's new Wean line is capable of handling 30,000-pound stainless steel coils from 24" to 52" in width and from .010" to .080" in thickness. The line operates at speeds up to 150 feet per minute. An even flow of materials is maintained in the processing section by two pay-off reels that permit rapid joining of coils.

The Wean "creative engineering" that resulted in these new design features has also been part of the development of annealing facilities for every major steel producer. This background of research and development is ready to help you solve your production and modernization problems.

THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO



Pittsburgh's Four Gateway Center is one of the most dramatic architectural uses of stainless steel in the world today. Even more dramatic to the architect, builder and owner is the remarkably low $7.50 per sq. ft. erected cost of the stainless steel curtain wall.

Washington Steel's gray ColorRold provided the means for accenting the vertical lines that make this edifice one of the most talked about buildings of our era.

4 Gateway Center, Pittsburgh
Harrison & Abramovitz, *Architects*
Limbach Co.,
Curtain Wall Contractor

WASHINGTON STEEL CORPORATION

and ColorRold®

PRODUCERS OF *MicroRold®* STAINLESS SHEET & STRIP

WASHINGTON, PA.

Correct Approach

Sir—The editorial in the April 20 issue of The IRON AGE ("The Peace Corps: It Requires Realism") is a correct approach to the peace corps. I am taking the liberty of photostating this page and am sending a copy to my Congressman and each of the Senators from Oklahoma.

The program suggested for the peace corps has been carried on in a small way by an organization known as World Neighbors, Inc. This is a voluntary organization and, though small, has been effective in several areas of the world.

World Neighbors was started in Oklahoma City and later had an office in Washington. Thanks again for a frank expression on a vital issue.—Parker W. Patterson, vice president, Patterson Steel Co., Tulsa, Okla.

Make or Buy

Sir—I read your reference to a recent make or buy study with great interest (IA, April 13, p. 53). I would appreciate receiving any information you may have regarding the availability of this study.—John W. Ryan, vice president, Mattel, Inc., Hawthorne, Calif.

▪ **For a copy of this study write: Bureau of Business Research, School of Business Administration, Univ. of Michigan.—Ed.**

On Red China

Sir—I am a little surprised at one of your recent editorials entitled "The Red China Question: More Bothersome All the Time." Your stand against admission of Red China to the United Nations is, in my opinion, rather unreasonable.

First of all you sound as though the U.N. was a U.S. monopoly. I thought it was an attempt at world government by all nations of the world. Since when is communism a bar to membership in the U.N.?

That Americans are still prisoners in China and that American newsmen are not allowed in China can hardly be considered relevant to barring membership in the United Nations for one quarter of the world's population.

On what sensible grounds can you exclude such a large part of the world? Because they are communists? So are many members of the U.N. Because they have slaughtered countless millions of people? Many members of the U.N. are hardly pure in this respect —Spain, Japan, Germany and many others, for example. Because their doors are not open to the West? Russia was that way until recently.

Your unfriendly attitude regarding the "British line" in this matter does you little credit. I would say that the British are more in tune with world opinion on this than the United States.

Surely if we are to ever hope for disarmament and an end to the possibility of nuclear annihilation, we will have to include Red China in our discussions. What do we gain by turning our backs on her in a rude and insulting fashion? We gain their undying enmity. Surely we have much more to gain by being able to argue and discuss and compromise before a world forum.

What's wrong with two Chinas being represented at the United Nations?—R. D. Barer, Victoria, B. C.

Kaldo Debut

Sir—Would you please be kind enough to forward several copies of your article "Kaldo Process Makes U. S. Debut" which appeared in the April 20 issue of IRON AGE. Please keep up the good work in the type of articles that you are now doing in such an excellent manner. —F. H. Garrety, J. E. Baker Co., York, Pa.

W. C. "Bill" Pine, our chief metallurgist says . . .

production-proved LAC-200 Series furnaces pay dividends on precision

BRAZING

Talk about controlled heat . . . easy operation . . . versatility . . . economy — and you're describing a Hayes Model LAC-200 Series Conveyor Brazing Furnace.

MULTI-ZONE HEAT CONTROL permits exact settings of temperature profiles — for quality work on each brazing, alloying, metal bonding or soldering cycle. When working with parts of unequal section, a pre-heat zone insures stabilized heat throughout the mass.

CONSTRUCTION MATCHES THE JOB. If an exothermic atmosphere is to be used, open chamber construction reduces equipment cost. For more refined atmospheres, muffles are available, which provide a baffling action to prevent creeping of temperature profiles.

WORK HANDLING IS EASIER, too, with a Hayes Model LAC-200 Series Furnace. Loading tables combine with constant belt feed to make this a remarkably high-production unit, per dollar cost and per foot of floor space.

VERSATILITY COUNTS. While designed for brazing, your Hayes furnace can double for annealing, hardening, and other heat treat operations. It's a bull for work!

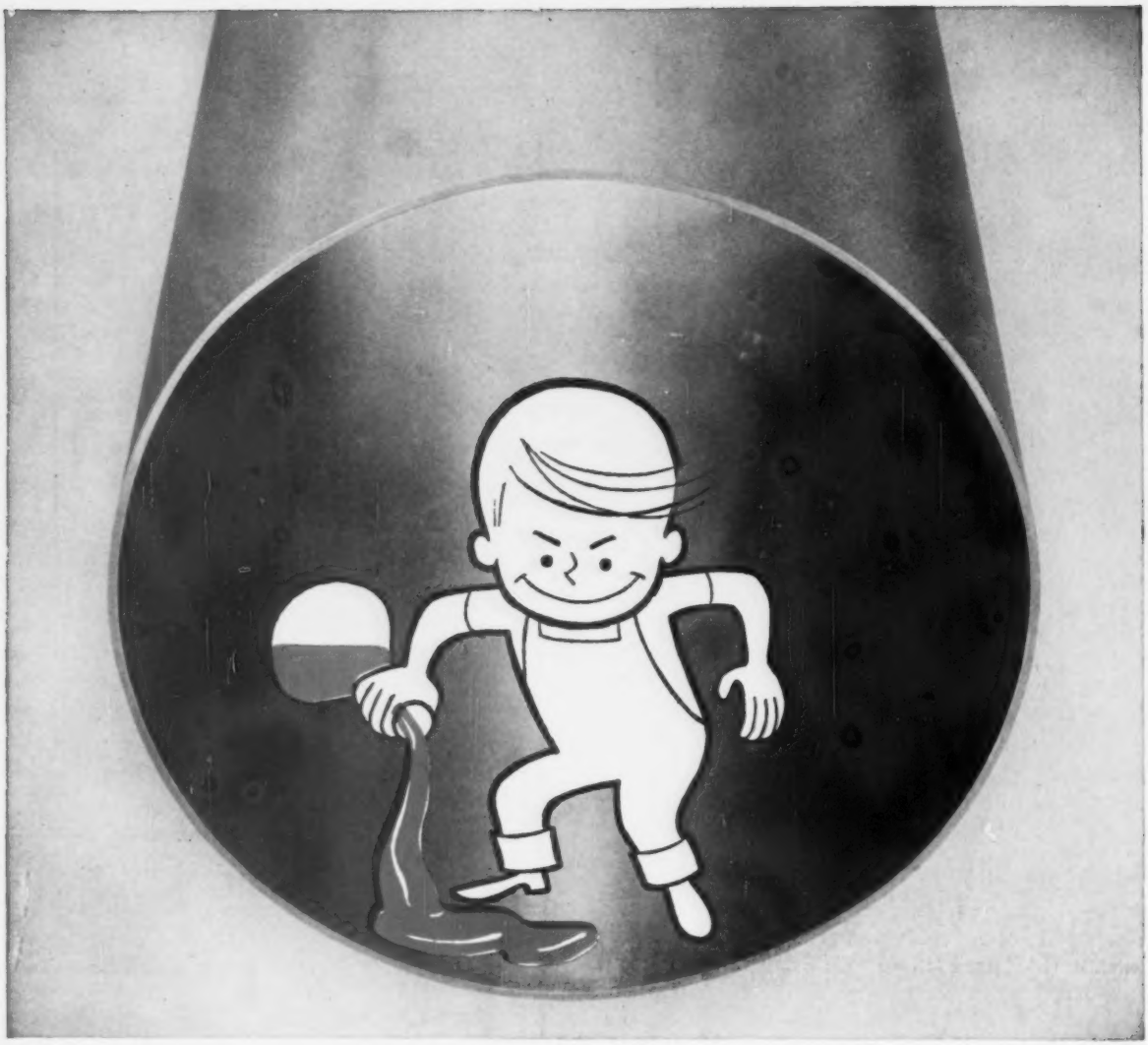
WHATEVER YOUR BRAZING NEED — from silver (1100°F range) to platinum (3400°F range with type M-Y or Vacuum Furnaces), Hayes know-how in equipment and engineering can come up with a RESULTS GUARANTEED answer . . . tested in our lab. on full-production equipment . . . proven by scores of successful installations in industry. Bulletin 5711A gives LAC details. For your copy, write C. I. Hayes, Inc., 821 Wellington Ave., Cranston 10, Rhode Island.

C. I. HAYES, INC.

Established 1905

ELECTRIC LAC GAS FURNACES

It pays to see Hayes for metallurgical guidance, lab. facilities, furnaces, atmosphere generators, gas and liquid dryers, Pow-R-Trol (TM) control units.

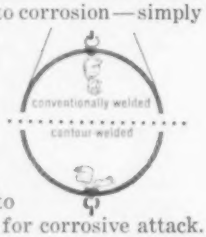


"The Gravity Kid" shows how

CONTOUR-WELDED STAINLESS TUBING DEFIES CORROSIVE ATTACKS

It's smoother inside than any other tubing—welded or seamless—because the patented* Contour-welding process virtually eliminates the weld bead. And this smoother surface ensures greater resistance to corrosion—simply because there are fewer focal points for corrosive attack.

You see, in conventionally welded tubing, gravity pulls the molten metal down into the tubing. This forms a bead that is difficult to remove by cold working. And cold working can lead to undercuts that become focal areas for corrosive attack.



Contour-welded tubing, however, is welded at the bottom. Gravity still pulls the molten metal down. But now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam closely conforms to the tubing contour.

Contour-welded tubing is smoother, too, than seamless. That's because it's formed from uniformly rolled strip steel, whereas seamless is extruded or pierced.

But get full details on this corrosion-resistant tubing. Send for our free 48-page manual on Contour-welded tubing in sizes from 1/8" to 40" O.D.—in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy.*

*U.S. Patent 2,716,692

*Trademark Haynes Stellite Co.

TRENTWELD® Stainless and High Alloy Tubing

Trent Tube Company, a Subsidiary of Crucible Steel Company of America. General Offices and Mills: East Troy, Wisc.; Fullerton, Calif.

Insight Into Germany

West Germany's economic boom has been steadily building up since the currency reform of 1948. Through its own efforts and Marshall Plan aid, the country has become a strong member of the Free World nations. At the same time, it also has become a formidable competitor of the United States in world markets.

How Long?—After well over a decade of industrial recovery and expansion, the question now is "How long will the boom last?"

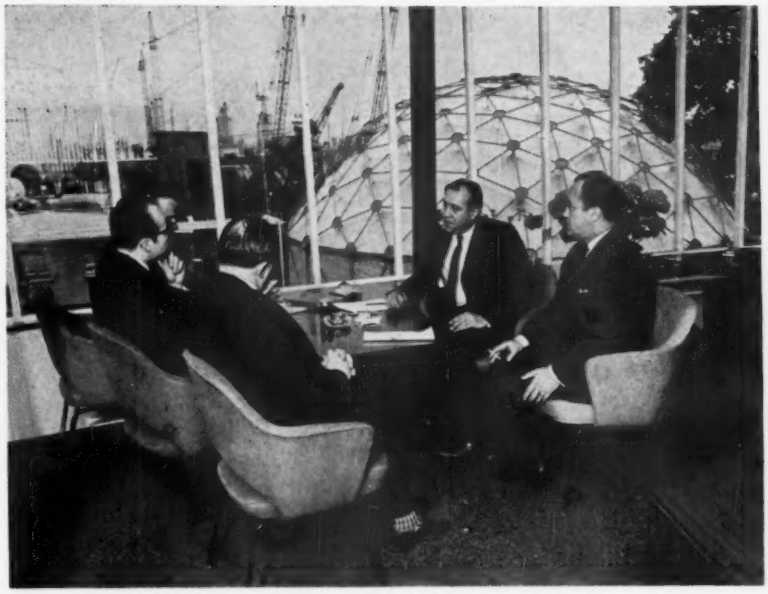
To find out, Managing Editor E. C. Beaudet recently completed a tour of West German metalworking plants. And this week begins a series of reports on the status of West German industry.

The trip was triggered by an invitation to visit the Volkswagen plants at Wolfsburg and Hanover. One look at the modern facilities of these plants made him decide to look further into the extent of West Germany's industrial strength.

Busy Tour—After Hanover, the trail led to the General Motors Corp.'s Opel Works in Russelsheim, near Frankfort, the Robert Bosch plant outside Stuttgart, and the machine tool factory of G. Boley in Esslingen. Next stop was the bearing plant of Kugelfischer, George Schaefer Co. in Schweinfurt. The famed industrial Ruhr couldn't be overlooked, so the Phoenix-Rheinrohr plants in that area were visited.

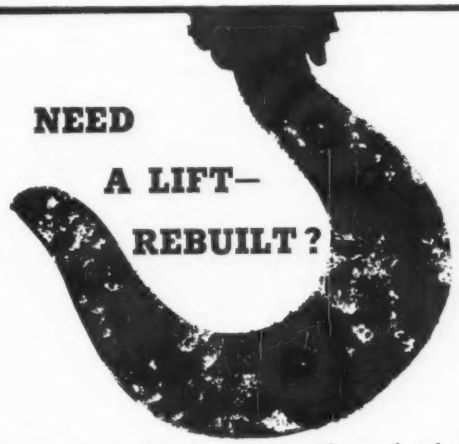
All along the way Gene talked with top German industrialists about the new problems brought about by the country's industrial expansion and the possibilities for future growth.

Note Taking—A complete view of country's industry was possible at the West German Industries Fair at Hanover (IA—May 11, '60, p. 78). While there, he talked with officials of the Mannesman A.G., one of West Germany's largest steel companies (see photo).



EARNEST TALK: Traveler E. C. Beaudet (second from right) interviews businessmen at Hanover Fair during his recent tour of West Germany.

Starting Now—This week's article, beginning on p. 105, details both the country's progress and its problems. In this and future articles you'll get a full-scale portrait of the country's industrial strength—another example of comprehensive coverage of metalworking, both within the U. S. and overseas, by The IRON AGE.



Cranes, cabs, trolleys—every type of heavy-duty hoisting equipment is a Pollock specialty. *Our* engineers work in *your* plant. Determine the least expensive way to modernize your facilities. Alter spans. Increase capacity. Convert D.C. to A.C. Install new control systems.

Pollock Engineering is the nation's leading redesigner and remanufacturer of heavy-duty cranes. Contact us, outlining your requirements.

POLLOCK
ENGINEERING CO., INC.
POTTSTOWN, PENNSYLVANIA

Your real 'best buy' is the one that fits! *Vancoram Silicon Alloys*

If the Silicon product you use isn't *exactly* fitted to your needs, it is *not* your best buy, no matter how much of a bargain it seems. And because Silicon has so many different applications in the making of steel, it is not always easy to be sure that a particular grade is the one that will make for the lowest final costs.

This is just where your VCA representative can be of most help to you. From the comprehensive range of Vancoram Silicon products, he is able to recommend and supply the one most suited to your needs. Use clean and uniform Vancoram Silicon products with confidence—they're 'job-balanced' for economy and quality controlled all the way! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N.Y.
Chicago • Cleveland • Detroit • Pittsburgh

VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

VANCORAM

COMING EXHIBITS

Design Engineering Show — May 22-25, Detroit Coliseum.

Tool Show—May 22-26, American Society of Tool and Manufacturing Engineers, New York Coliseum. (Society headquarters, 1070 Puritan, Detroit 38, Mich.)

Plastics Exposition—Ninth annual, June 5-9, New York Coliseum.

Instrument - Automation Show — June 5-8, Instrument Society of America, Royal York Hotel, Toronto, Canada.

MEETINGS

MAY

Fluid Controls Institute, Inc.—Annual meeting, May 21-23, The Closter, Sea Island, Georgia. Institute headquarters, P. O. Box 667, Pompano Beach Florida.

Industrial Heating Equipment Assn., Inc.—Spring meeting, May 21-24, Hot Springs, Va. Assn. headquarters, 2000 J St., N. W., Washington, D. C.

Magnesium Assn. — Annual meeting, May 21-24, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 122 E. 42nd St., New York.

ASTME Manufacturing Engineering Conference—May 22-26, New York Coliseum. American Society of Tool and Manufacturing Engineers, 10700 Puritan Ave., Detroit 38.

Anti - Friction Bearing Manufacturers Assn., Inc. — Annual meeting, May 23-25, Sea View Country Club, Absecon, N. J. Assn. headquarters, 60 E. 42nd St., New York.

American Supply & Machinery Manufacturers Assn., Inc. — Triple industrial supply convention, May 23-25, Atlantic City, N. J. Assn. headquarters, 2130 Keith Building, Cleveland.

(Continued on P. 27)

Now Danly engineering pierces more fender skirts with one!

It took three separate presses to pierce 62 mounting holes and shear pairs of inner fender skirts for a major automobile maker. Then Danly engineers were invited to cut costs. And they did! They designed this up-acting mechanical press with built-in hydraulic piercing units to do the job better and faster. It's engineered to turn out 600 fender skirts per hour—considerably more than the three presses it replaced! Much more economically, too, because it also eliminates two sets of complex cam type piercing units and the automation between the presses. Greatly reduces labor costs and floor space requirements, too.

The solution to this problem of how to accomplish these many operations on an irregularly-shaped piece of metal required broad experience in mechanical press, hydraulic press and hydraulic piercing equipment design—plus a good deal of imagination. This made the job a "natural" for Danly because, in each of these areas, Danly engineers are known to excel. Perhaps you, too, have a press problem that's a natural for Danly engineers. Shall we discuss it?

DANLY®

NEW ENGINEERING BULLETIN
—tells just what this mechanical-hydraulic press does—and how it does it. Write for your copy.

PRECISION PRESSES, DIE SETS AND DIEMAKERS' SUPPLIES

DANLY

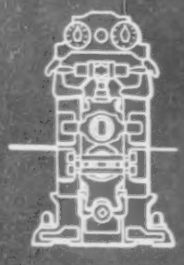
DANLY MACHINE SPECIALTIES, INC., 2100 South Laramie Avenue, Chicago 50, Illinois

for a mill that can roll back your cost barrier...

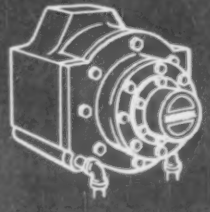
ENGINEERING

COUNSEL

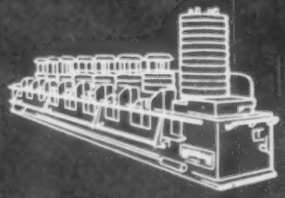
CS2 © MORGAN CONST. CO. 1961



ROLLING MILLS



MORGOIL BEARINGS



WIRE DRAWING MACHINES

COMBUSTION CONTROL

MORGAN has the take-charge team of design and construction specialists

START UP

ERECTION

Long before foundations go in — long after "design" tonnage is reached — Morgan skills and experience are hard at work to protect profitability in your mill. They smooth the way at every stage of construction with an unmatched depth of technical support; provide tangible savings for every production "turn" with an unparalleled backlog of field-tested mill knowledge. How advantageously this affects operating statements is shown by the impressive list of reorders from Morgan mills round the world.

Steel

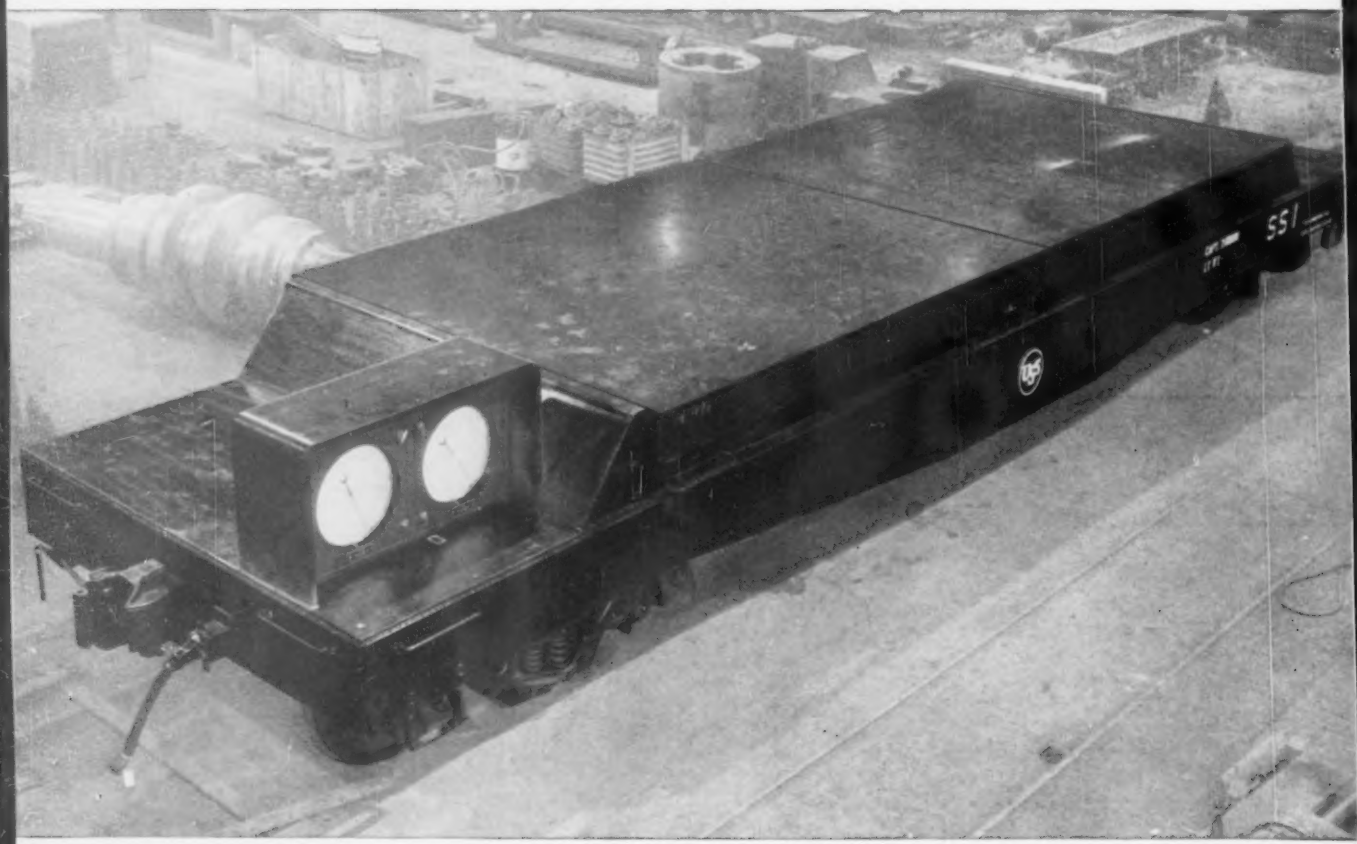
MORGAN WORCESTER

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS

THE KEY NAME FOR PROGRESS IN STEEL-MAKING EQUIPMENT

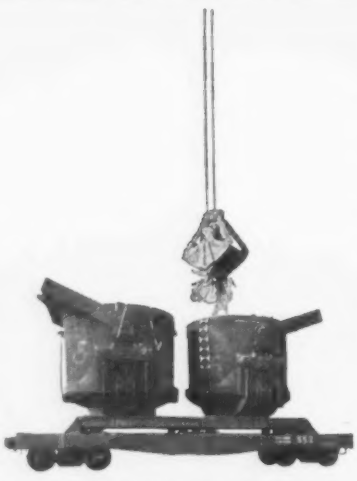
We think this all-purpose weigh car is too good to keep to ourselves

This mark tells you a product is made of modern, dependable Steel.



Weigh anything up to 100 tons, anywhere on the track, with this new, all-purpose weigh car. It's accurate to within two-tenths of one percent of anything up to 100 tons or two separate 50-ton loads. Because the hydraulic load cells need no power, you can weigh anywhere. A weigh car can pay for itself by eliminating guesswork and human error.

At McLouth Steel Corporation in Detroit, Michigan, they cut handling time by weighing stainless steel scrap and other expensive alloying ingredients right in their stock yard. Accurate weight records give them better control of inventory and charging mixtures and make it easier to find the yield cost. Other steel producers cut costs by weighing to control electric furnace yields. We build this all-welded, stress-relieved steel car to stand up under all of these uses and give long, dependable service.



Loading scrap at McLouth Steel does double duty because the weighing is done at the same time. This cuts handling time in the mill and gives better control of the charging mixtures.

USS Weigh Cars and other industrial cars are built to last by United States Steel, a company that also uses them! We can custom design and build any type weigh car to suit your needs. Send your weight problems to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

United States Steel Corporation, Pittsburgh
Columbia-Geneva Steel, San Francisco
Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

United States Steel

USS

TRADEMARK

MEETINGS

(Continued from P. 23)

American Iron & Steel Institute—General meeting, May 24-25, Waldorf-Astoria Hotel, New York. Institute headquarters, 150 E. 42nd St., New York 17, N. Y.

Electronic Industries Assn. — Annual convention, May 24-26, Pick-Congress Hotel, Chicago. Assn. headquarters, 1721 DeSales St., N. W., Washington, D. C.

Conveyor Equipment Manufacturers Assn. — Technical committee meeting, May 25-26, Burlington Hotel, Washington, D. C.

JUNE

American Gear Manufacturers Assn.—Annual meeting, June 4-7, The Homestead, Hot Springs, Va. Assn. headquarters, 1 Thomas Circle, Washington.

Society of Automotive Engineers, Inc. — Summer meeting, June 5-9, Chase-Park Plaza Hotel, St. Louis. Society headquarters, 485 Lexington Ave., New York 17.

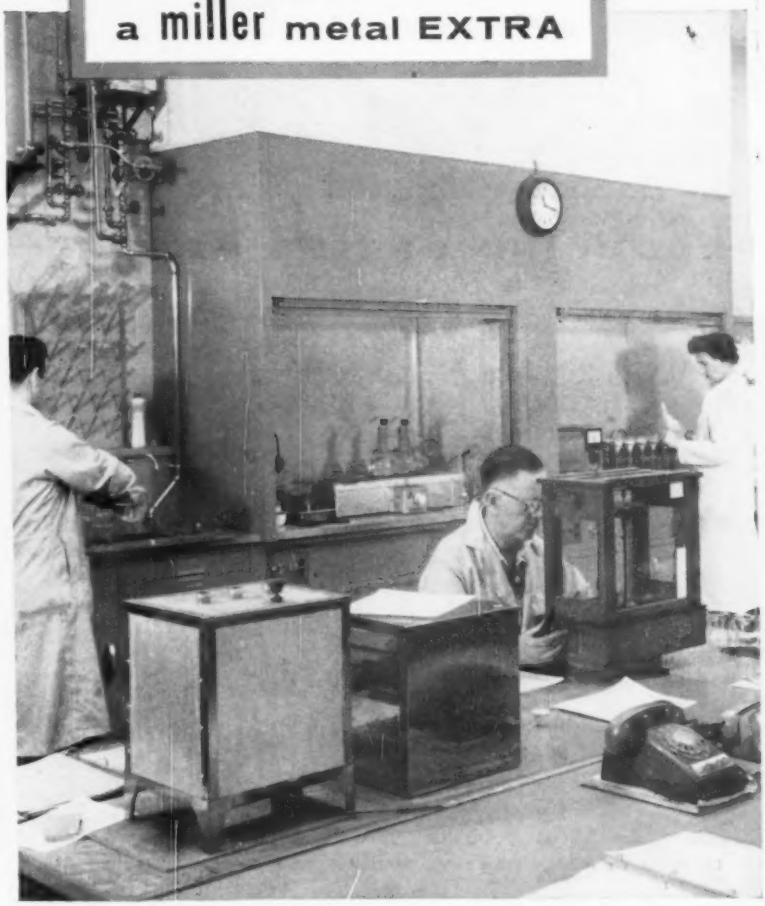
Appalachian Underground Corrosion—Short course, June 6-8, West Virginia University, Morgantown, W. Va.

National Assn. of Secondary Material Industries, Inc.—Pacific Coast Div. regional meeting, June 8, Benjamin Franklin Hotel, Seattle, Wash.; Midwestern Div. regional meeting, June 15, Statler - Hilton Hotel, Cleveland. Assn. headquarters, 271 Madison Ave., New York 16.

Manufacturing Chemists Assn., Inc.—Annual meeting, June 8-10, The Greenbriar, White Sulphur Springs, W. Va. Assn. headquarters, 1825 Connecticut Ave. N.W., Washington 9, D. C.

Society of Plastics Engineers, Inc.—Regional technical conference, June 14, Montreal, Canada. Society headquarters, 65 Prospect St., Stamford, Conn.

a miller metal EXTRA



reject-reducing, cost-cutting

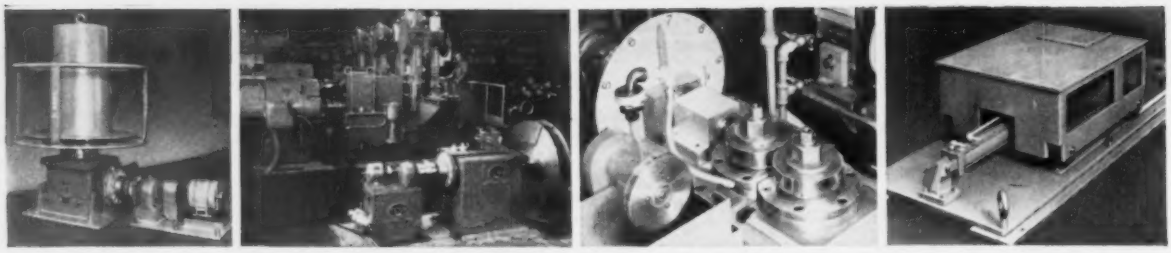
INDIVIDUALIZED QUALITY CONTROL

Miller metallurgists make sure every bit of metal that leaves the Miller mills exactly meets all customer specifications. Your individual metal order is checked and rechecked at every stage of production . . . with the skill and care an old Bavarian brewmaster applies to his art. Each time you order metal you can be sure that everyone at Miller feels that his job isn't finished until that metal is in your plant, on your machines and completely satisfactory in every way. For expert technical help, meticulously produced high-grade metal and dependable delivery, place your next order for brass, bronze or nickel-silver strip, copper or copper-alloy tube in special shapes and sizes with the specialists at Miller . . . where you're a name, not just a number on the job ticket.

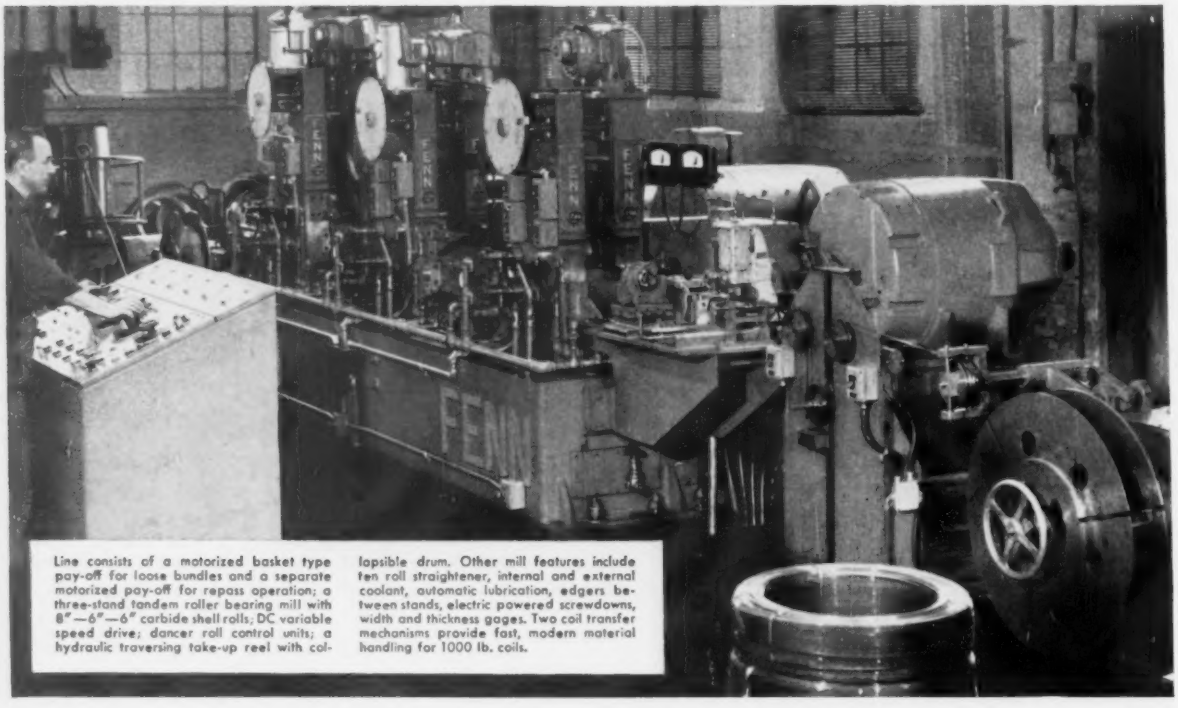
ROLLING MILL DIVISION
Meriden, Connecticut

miller SINCE 1849

Tube Subsidiary
A. H. WELLS, INC.
Waterbury, Connecticut



PRODUCING SPRING STEEL FLATS AT 3100 FPM



Line consists of a motorized basket type pay-off for loose bundles and a separate motorized pay-off for repass operation; a three-stand tandem roller bearing mill with 8"—6"—6" carbide shell rolls; DC variable speed drive; dancer roll control units; a hydraulic traversing take-up reel with collapsible drum. Other mill features include ten roll straightener, internal and external coolant, automatic lubrication, edgers between stands, electric powered screwdowns, width and thickness gages. Two coil transfer mechanisms provide fast, modern material handling for 1000 lb. coils.

pace-setting precision wire flattening mill

This three-stand tandem mill represents the finest in high speed precision wire flattening equipment. Installed at one of the nation's largest producers of spring steel, it offers significant advantages in flexibility, customer service, and finer stock finish. Production is greatly simplified with special material handling accessories, and the ability to produce flats from starting rounds entirely eliminates the customary slitting operation. Perhaps, like this progressive manufacturer, the time is at hand to evaluate your wire flattening equipment in terms of the economic justification for modernizing to the standards set by Fenn mills. Fenn's long experience is at your service. Fenn engineers will study your specific requirements and make recommendations for equipment to your competitive needs. The Fenn Manufacturing Company, Fenn Road, Newington, Connecticut.

Designed and Built by FENN

ANNOUNCING ANOTHER *NEW* COST-REDUCING

Strain-Tempered® Grade

NOW...THE INDUSTRY'S MOST COMPLETE LINE OF HIGH-STRENGTH COLD FINISHED STEEL BARS

NEW for maximum machinability

Strain-Tempered 4145 Leaded is the easiest-to-machine high-strength alloy bar you can buy. Heat treatment and related distortion corrections after machining are eliminated. Tool life is increased. Both material and processing costs are reduced. Strain-Tempered 4145 Leaded is another money-saving development of Bliss & Laughlin research.

Guaranteed Minimums: 150,000 psi tensile strength; 130,000 psi yield strength; 302 Brinell. Approximate minimums: 10% elongation in 2"; 35% reduction in area.

LOWEST COST for highest strength

Strain-Tempered alloys are also produced to other strength levels at savings from $29 to $87 per ton. Grades like 4140 and 5150, for example, can be produced to individual mechanical property specifications such as: 115,000, 125,000 or 145,000 psi minimum tensile strength; 95,000, 105,000 or 125,000 psi minimum yield strength; 217/255, 269/321 or 275/325 Brinell and 27/34 or 28/36 Rockwell "C". Various combinations of severe cold working and special furnace treatment tailor the material to your exact requirements.

PAY ONLY for the grade needed

As in the case of Strain-Tempered Alloy, Strain-Tempered Carbon Bars are available in a variety of grades. You pay only for the grade which meets your machinability needs. These bars offer a unique combination of high strength, long wearability, good ductility and a low level of residual stresses.

Guaranteed Minimum: 100,000 psi yield strength for standard Strain-Tempered C1144.

ASK FOR FOLDERS

NEW Strain-Tempered 4145 Leaded Now in Stock at Steel Service Centers

Specialists in Finish, Accuracy, Straightness, Strength and Machinability

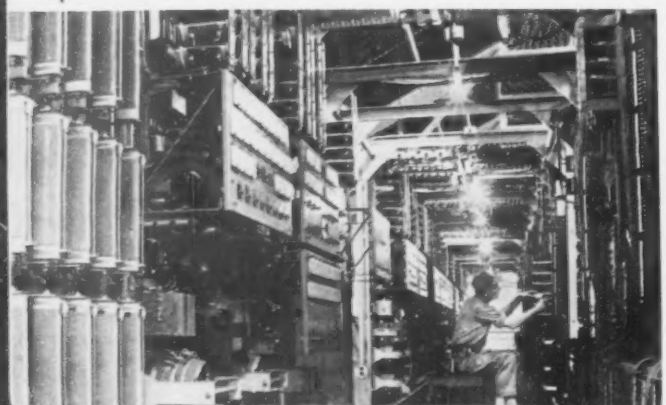
BLISS & LAUGHLIN

GENERAL OFFICES: Harvey, Ill. • MILLS: Harvey, Detroit, Buffalo, Los Angeles, Seattle, Mansfield, Mass.

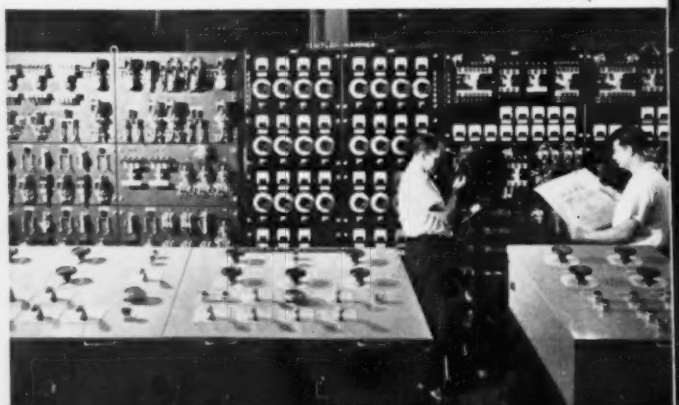
Leading Independent Producer of Cold Finished Steel Bars

BL-612

Call in the C-H man early! Broad experience in all phases of systems control design means the Cutler-Hammer man brings a knowledgeable eye to your particular control problems. Whether your requirements call for a unique solution, as this Granite City job did, or a more standardized system, call Cutler-Hammer.



Cutler-Hammer Test Floor. Here, complete factory tests of systems control prior to shipment insure faster installation, more trouble-free start-ups. Analog computer-simulator can test engineering solutions before construction; simulate response of any motor or machine to aid in actual factory tests.



CONTROL

What's new in systems control?

New Cutler-Hammer synchro tower position control smooths operation of Granite City tinning line

New approach provides stepless tower movement, cuts maintenance required by older systems

Stepless control over the entire range of tower movement is provided for the first time in the steel industry by Cutler-Hammer. In addition, a continuous visual indication of the exact looper position is always available to the operator.

Both entry and exit towers of the tinning line at Granite City Steel Company in St. Louis utilize this new synchro control.

Less Maintenance

Synchro control eliminates the steps, and greatly reduces the amount of maintenance commonly associated with photoelectric tower control systems. Results? Better control, smoother operation of entry and exit sections, which is echoed in better control of the tinning and cleaning section and of the entire line.

The tinning section is where accurate and synchronized speed regulation provided by the systems control engineer contributes to obtaining the ultimate in tin coated strip.

The complex array of continuous process equipment on the Granite City line is driven by 85 D-c motors totalling 1044 hp and is powered by 13 D-c generators. These 98 rotating machines are tied together by a control system which includes 15 static type regulators to insure superior line performance.

Among the reasons for recent Cutler-Hammer achievements in continuous process control is a standard factory pretest procedure, plus an analog computer-simulator that can help engineers test solutions before construction. *You get more benefits when you call in your Cutler-Hammer systems man early in your planning.*

What's new at Cutler-Hammer?

Recent leadership in tinning line control is matched by other Cutler-Hammer systems automation in dozens of continuous process lines. Look for more "firsts" from Cutler-Hammer . . . we've geared up with new production facilities, new engineering talent . . . a *new desire* to help the primary metals industry meet the challenge of the sixties! Call in your Cutler-Hammer man early in your planning.

WHAT'S NEW? ASK...

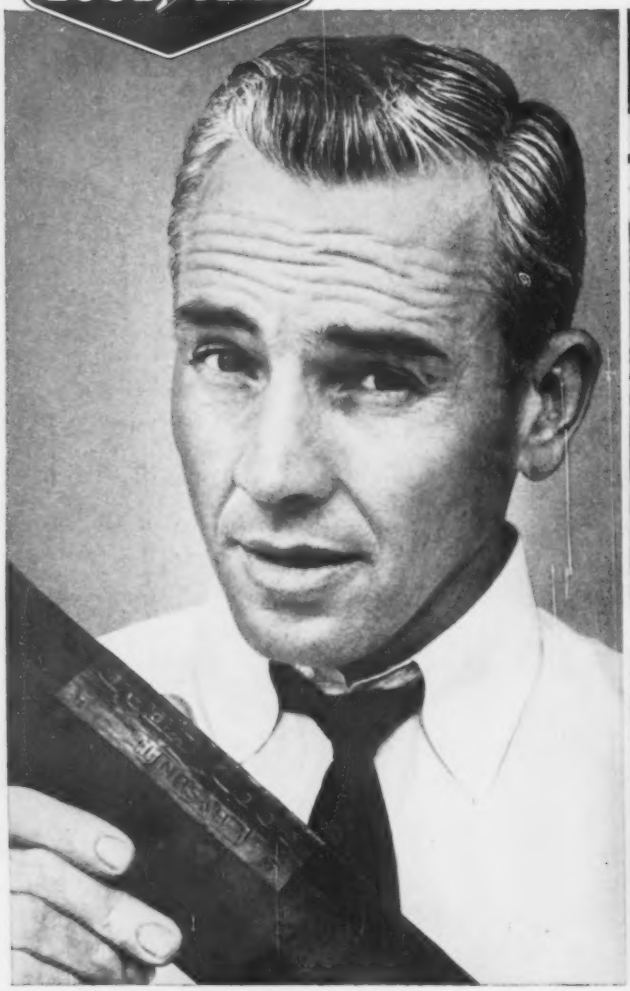
CUTLER-HAMMER

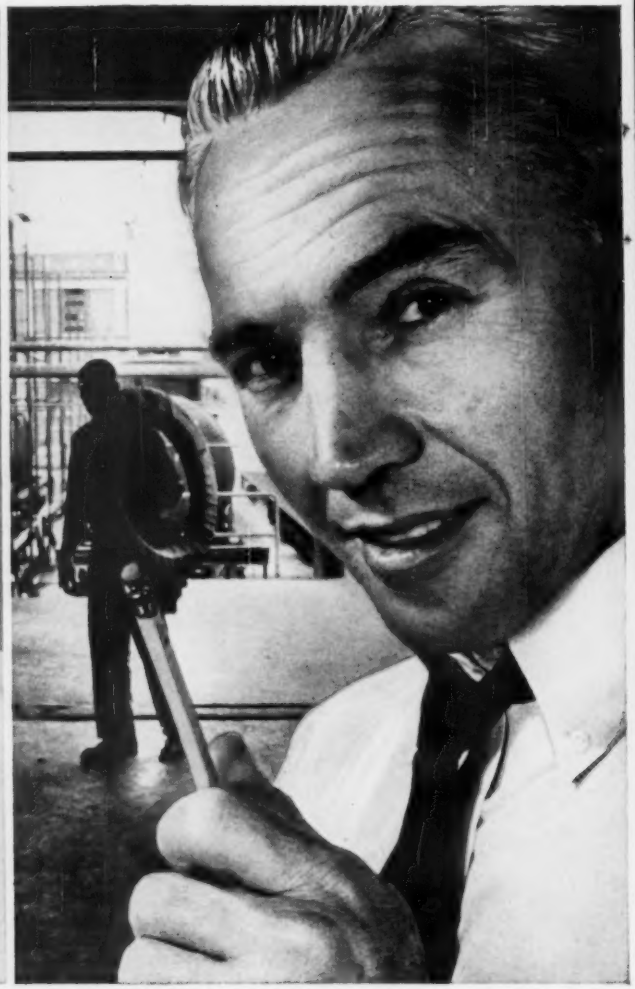
CONTROL

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

Why I always

GOODYEAR





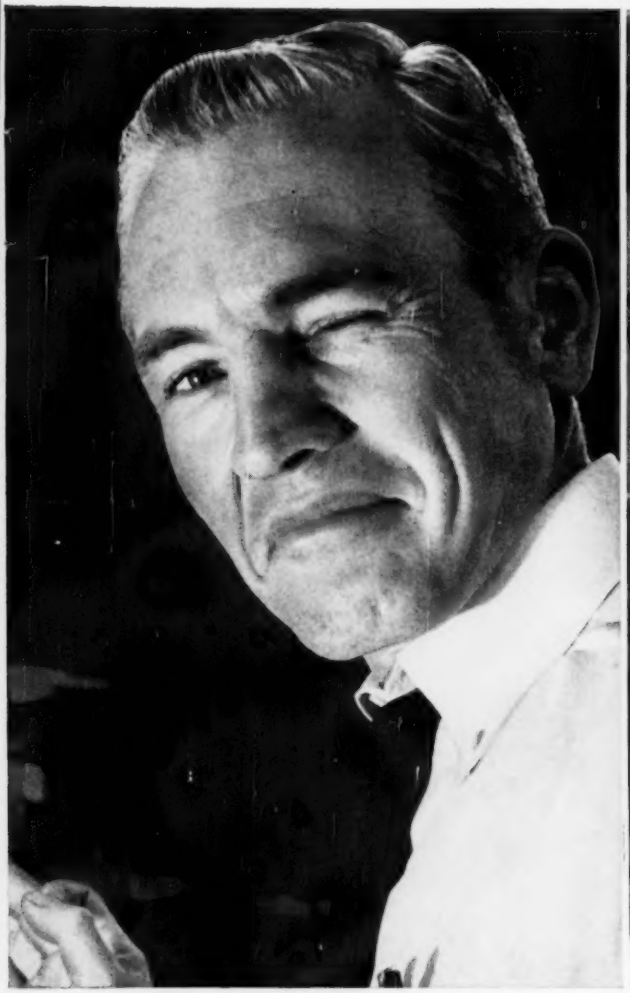
THEY MAKE EVERY HOSE I NEED
(No more time and money wasted looking for exactly the right kind of hose for a job *–Goodyear's got it!)*

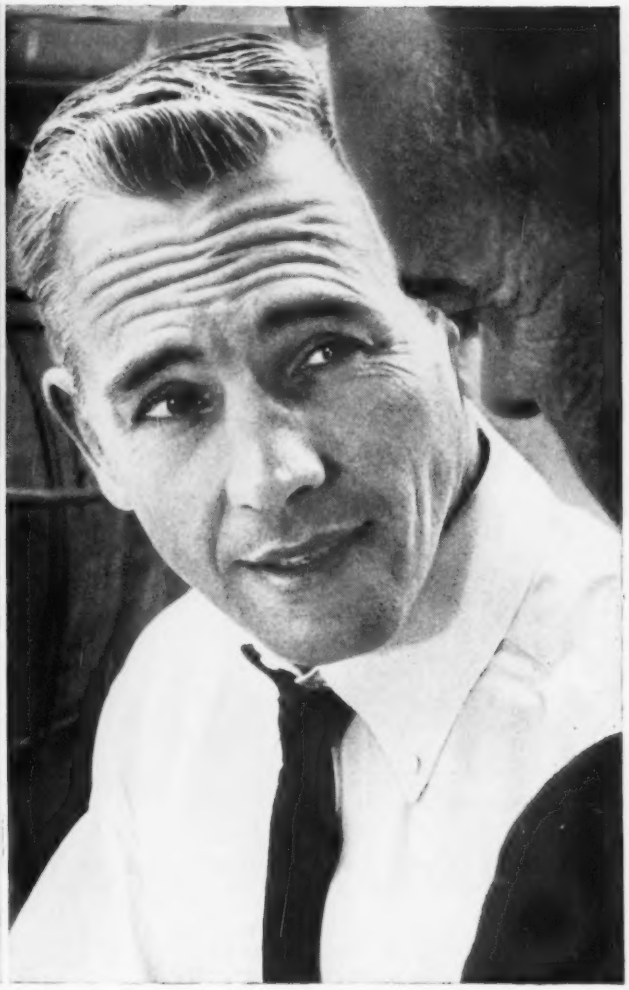
THEY'VE GOT FAST DELIVERIES I NEED
(No more out-of-stock delays! Via network of stocking distributors in all parts of the country–*Goodyear's got it!)*

For the right hose... at the right place... at your Goodyear Distributor... first in service

Lots of good things come from GOOD

buy hose from Goodyear





THEY HAVE TOP QUALITY I NEED
(No more settling for second-best. When it comes to quality, reliability and safety *–Goodyear's got it.)*

THEY OFFER TECHNICAL HELP I NEED
(No more guesswork. For expert help through the G.T.M. – Goodyear Technical Man–*Goodyear's got it.)*

the right time... at the right price... call with all industrial rubber products

Or write Goodyear, Industrial Products Division, Akron 16, Ohio

GOODYEAR INDUSTRIAL PRODUCTS

LONGER SHOP LIFE

Here's economy for you, combined with finest quality... Nicholson or Black Diamond industrial saw blades—precision made and rugged to give you longer shop life per blade.

Because they're top quality in every respect, because they're Nicholson designed, you use a minimum number of these blades a year... and save valuable labor time each time you use one. You also get clean cutting because each blade is designed for specific kinds of metal cutting.

Your distributor* carries a full line of these fine Nicholson or Black Diamond industrial blades —hand hacksaw, power hacksaw and band saw. Prove out the economy-through-quality story for yourself. Order a supply today.

* Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.

Nicholson File Company, Providence 1, Rhode Island
Files • Rotary Burs • Hacksaw and Band Saw Blades
• Ground Flat Stock • Industrial Hammers

NICHOLSON U.S.A. NICHOLSON BLACK DIAMOND U.S.A.

How Nickel gets music out of solid rock

Deep in the Caverns of Luray in Virginia is one of the world's musical marvels—the famed "Stalacpipe" organ—a unique instrument that gets rare tonal beauty from age-old stalactites.

To get music out of solid rock, the stalactites have threaded metal rods bolted through them—close to small, wire-wound magnets. When an electronically-controlled hammer strikes a stalactite, the combination of rod and magnet becomes a tone generator whose impulses pass out through an amplifier.

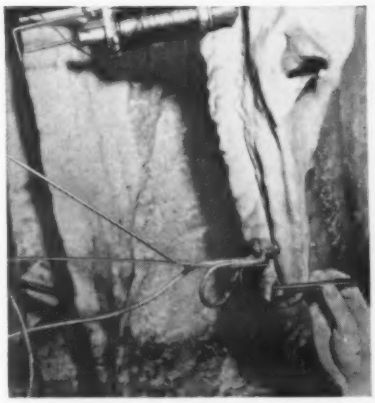
Imagine the dampness of the Caverns . . . the rust-producing environment . . . and what could soon happen to these musical rods bolted through the rock. Here is where a metal has to really prove itself.

Nickel means trouble-free performance. To prevent excessive rust and resulting expansion that could easily crack or snap off the stalactites, a special electrical steel—a steel with Nickel in it—was chosen. This high nickel alloy steel—47-50% Nickel—stands up to the eternal dampness of this underground concert hall . . . and provides the exact combination of magnetic properties needed for low power requirements and full high fidelity.

Don't overlook Nickel even if you're not thinking of building an underground organ anytime soon. Alone or with other elements Nickel improves hundreds of alloys . . . makes possible almost any combination of properties for fabricating or service demands.

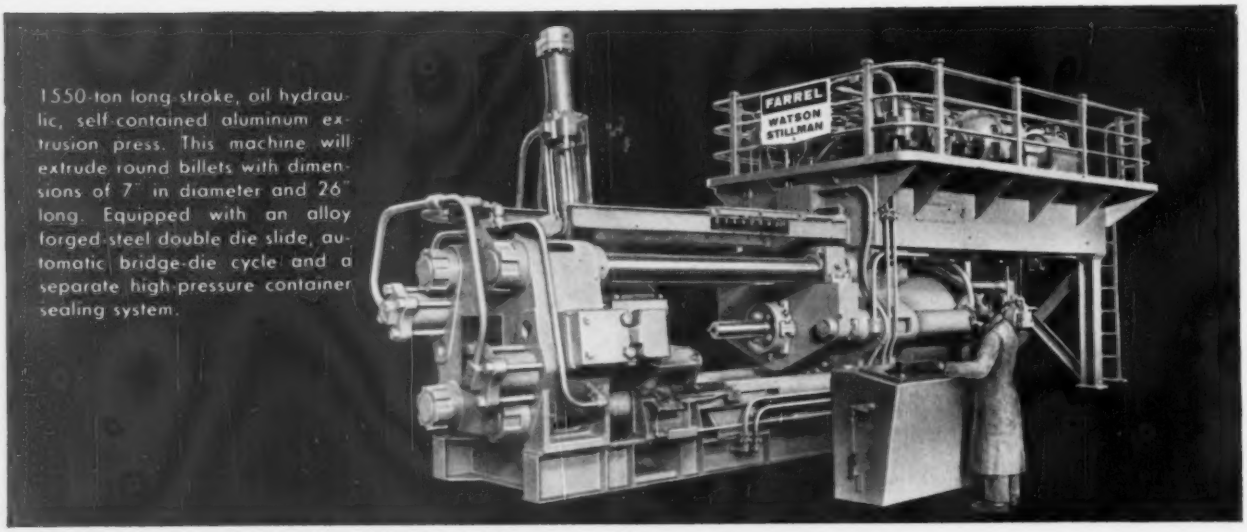
Whatever your metal problem—high or low temperatures, corrosion, stress, or an unusual combination of factors—consider the advantages of Nickel. For more information, just write us.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N.Y.



Big tone from little Nickel alloy rods. Pen shows the size of Allegheny Ludlum Steel Corporation's AL-4750 nickel alloy special steel rods bolted through ancient stalactites. The rods vibrate with the rock after being struck by rubber-tipped hammers.

INCO NICKEL
NICKEL MAKES ALLOYS PERFORM BETTER LONGER



1550-ton long-stroke, oil hydraulic, self-contained aluminum extrusion press. This machine will extrude round billets with dimensions of 7" in diameter and 26" long. Equipped with an alloy forged-steel double die slide, automatic bridge-die cycle and a separate high-pressure container sealing system.

5 REASONS WHY
more and more extruders are

The demand for Farrel Watson-Stillman extrusion presses and stretchers has continued at a high level. Not only are stock presses sold before completion, other machines — such as those illustrated — have also been in demand.

There are five good reasons for this continuing activity:

1. PRESS DESIGNS

These are modern presses, designed by specialists in hydraulic equipment with a century of experience to draw upon. In addition to their well-known rugged construction, the machines incorporate many outstanding features, which make them economical to operate, and high in production speed and efficiency.

2. BROAD SELECTIVITY

Both self-contained and specially designed aluminum extrusion presses are available in capacities from 600 to 5000 tons. Detwisting and straight-pull stretchers are built in standard sizes from 15 to 200 tons. Special sizes built to order. The company is also prepared to supply all necessary auxiliary equipment, such as billet heaters, die heaters, aging ovens and conveyors.

3. QUALITY CONTROL

An unusual degree of quality control is maintained — from initial casting to final testing — through a coordinated manufacturing procedure that draws on the experience and facilities of the entire Farrel organization. Presses are assembled and tested under dry-run conditions before shipment. Customers may inspect their equipment during manufacture and final testing.

4. INSTALLATION AND INSTRUCTION

A Watson-Stillman engineer supervises the final installation and start up of the press, and instructs company personnel in all phases of press operation.

5. COMPLETE PLANT LAYOUTS

Watson-Stillman is prepared to engineer complete installations. This service includes the preparation of plans for efficient location of all units and the supply of all related equipment.

Ask to see a Farrel representative for a discussion of your extrusion objectives.

FARREL-BIRMINGHAM COMPANY, INC.
WATSON-STILLMAN PRESS DIVISION

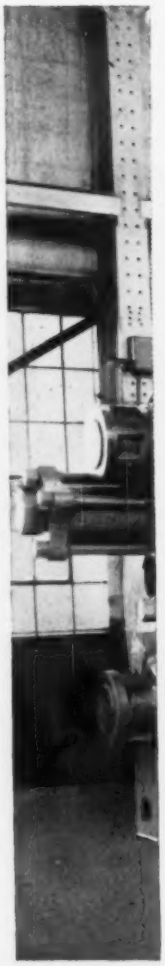
565 Blossom Road, Rochester 10, New York
Telephone: BUtler 8-4600

Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Manufactured in Canada by Canadian Vickers Limited

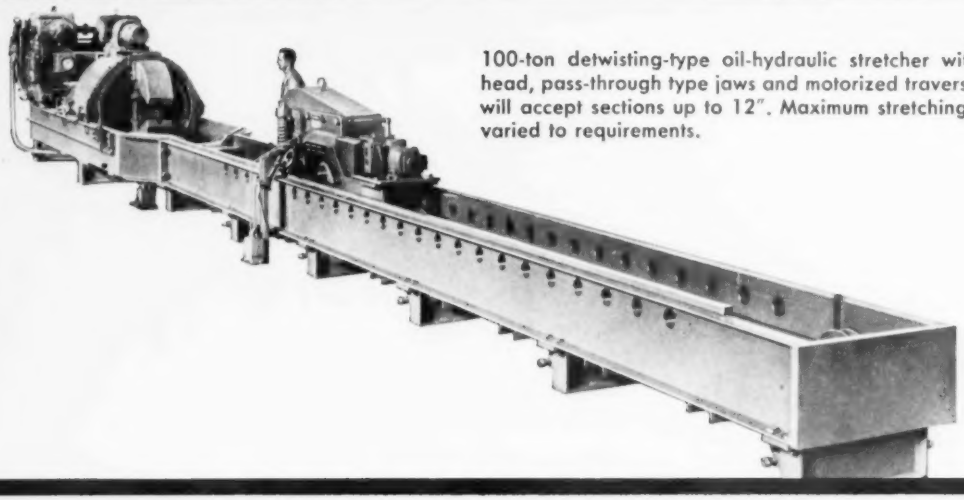
FARREL
WATSON
STILLMAN

WS-80



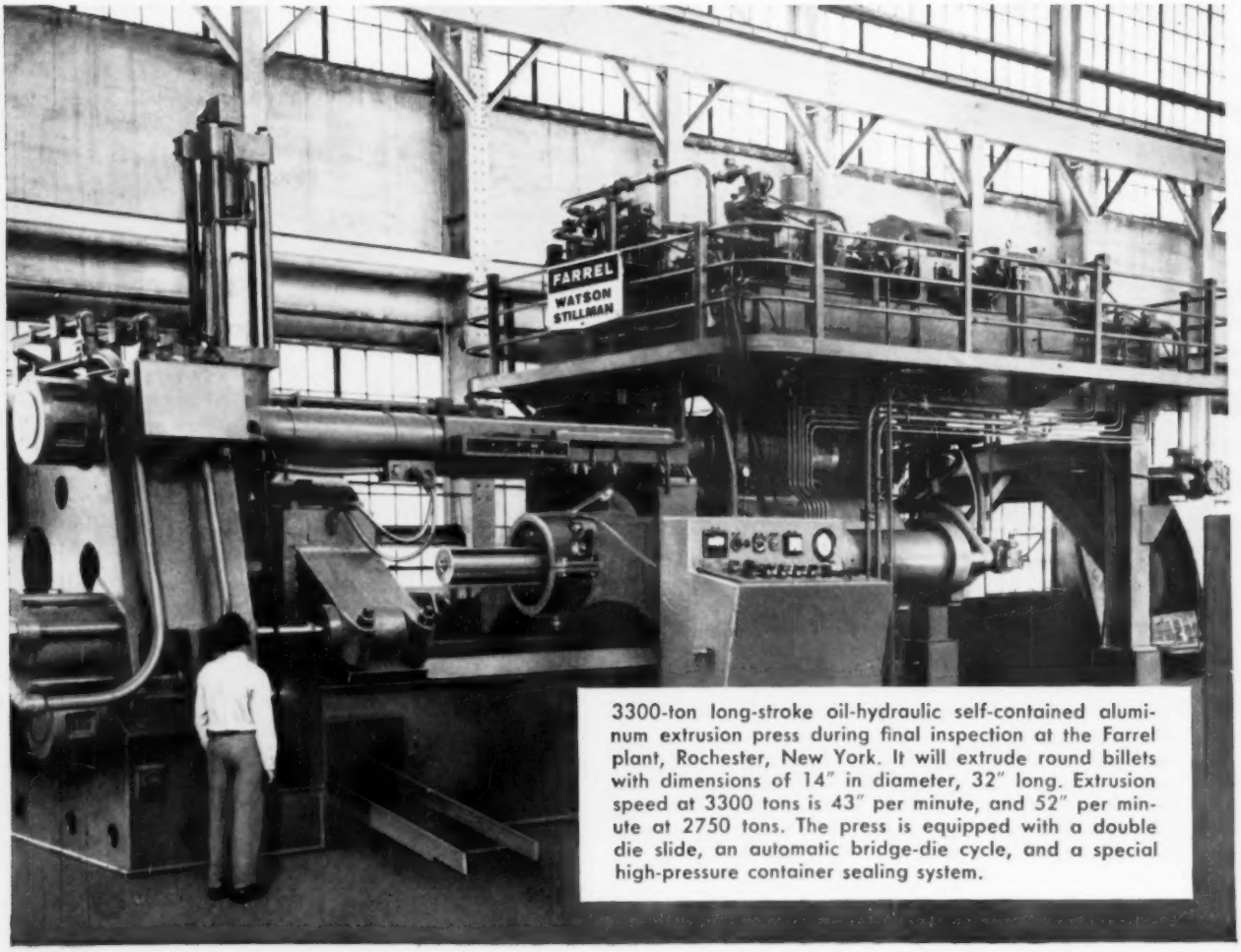
OTHER TYPES OF FARREL WATSON-STILLMAN HYDRAULIC EXTRUSION PRESSES

aluminum • brass • bronze • carbon • ceramics • copper cordite • crayon • graphite lead • lead pipe • magnesium • phosphor bronze • silver alloys and precious metals • solder • steel • welding rod • wire and special alloys



100-ton detwisting-type oil-hydraulic stretcher with motor-driven head, pass-through type jaws and motorized traverse. Jaw opening will accept sections up to 12". Maximum stretching length may be varied to requirements.

specifying Farrel Watson-Stillman



3300-ton long-stroke oil-hydraulic self-contained aluminum extrusion press during final inspection at the Farrel plant, Rochester, New York. It will extrude round billets with dimensions of 14" in diameter, 32" long. Extrusion speed at 3300 tons is 43" per minute, and 52" per minute at 2750 tons. The press is equipped with a double die slide, an automatic bridge-die cycle, and a special high-pressure container sealing system.

How a nut can make (or break) your reputation

. . . and even bring in re-orders

A nut comes loose. A wheel comes off. And down comes Billy! No great loss, except perhaps to his dignity. But when a lost nut knocks out a rock drill, or a tractor, or a piece of the heavy equipment that *you* make—then what?

Down goes the machine! *Down* goes production—for no telling how long! *And down goes your reputation as a maker of quality equipment!* You can blame it on the nut, but your customer blames *you!*

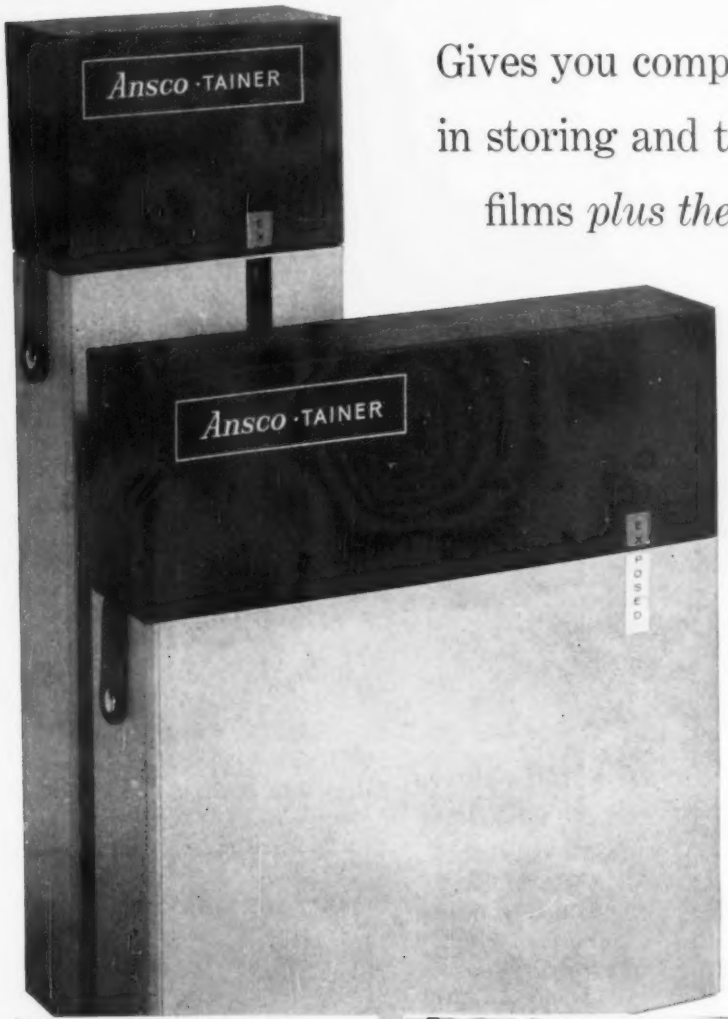
This kind of embarrassing and costly "Reliability" failure simply cannot occur when you specify Elastic Stop® nuts for critical bolted connections. For no matter how rugged or repeated the shock or impact, no matter how bone-shaking or constant the vibration . . . Elastic Stop nuts *simply will not work loose!*

Elastic Stop nuts with their exclusive, vibration-damping nylon locking inserts are nothing new. They have been widely used for over 20 years by an increasingly large number of quality-conscious manufacturers who have learned that Elastic Stop nuts give built-in insurance against product failure —the kind of reliability that shows up in customer maintenance records and adds up to reorders. Let us send you information showing how manufacturers have protected the reputation of their products with Elastic Stop nuts. Ask for Bulletin 5901. Dept. S47-577, Elastic Stop Nut Corporation of America, 2330 Vauxhall Road, Union, New Jersey.

for the ring of reliability

ELASTIC STOP NUT CORPORATION OF AMERICA

NEW ANSCO-TAINER!



Gives you complete safety in storing and transporting X-ray films *plus these important extras:*

1. Lightweight—strength without bulk.

2. Light-tight—completely light sealed.

3. Superior construction—protects film against artifacts.

4. Durable—Long-wearing plastic finish resistant to stains.

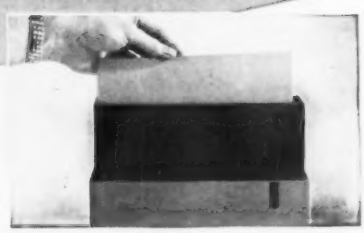
5. Perfect size—carries just the right amount of film needed to do the job . . . will hold a 75 sheet interleaved or 150 sheet non-interleaved Pouchpak from a Superpak or Bulkpak® carton.

6. Economy—costs far less than expensive suitcase containers.

7. Easier darkroom handling—cover opens and closes with ease in dark.

But the new ANSCO-TAINER has to be seen to be appreciated! Handsome, versatile, the perfect darkroom-to-equipment-area X-ray film carrier. Pack it, pick it up and go . . . no bulky cases when bulk is unnecessary. As protective and as safe for your film, as the darkroom itself! Ansco, Binghamton, New York, A Division of General Aniline & Film Corporation.

Versatile—the Ansco-Tainer is the right size for most jobs. Holds a complete Pouchpak from a Superpak or Bulkpak carton.



A few sheets or a single sheet . . . complete safety for exposed or unexposed film, with all the convenience of total portability.

Ansco

X-ray

$10,000. in Awards for Hot Dip Galvanizing Ideas

Ten awards offered by American Hot Dip Galvanizers Association in cooperation with American Zinc Institute

Galvanizers International Award

THINK! Think about new uses for Hot Dip Galvanizing! Or, improvements in present uses! Or, new methods of after treatment! If your idea is accepted, you will receive one of ten awards of $1000 in cash, plus a handsome medal, plus an engrossed Certificate of Achievement.

Not a contest but a search for new ideas

This is not a contest—it is a search for new ideas. Your entry will not be judged against others, but solely on its merit and value in developing new applications and markets for Hot Dip Galvanizing. If your idea, in the opinion of the judges, is of practical value to the industry, you will be cited for an award—promptly.

The Hot Dip Galvanizing Industry is anxious to receive ideas of this type; therefore, the judges reserve the right to present *more than 10 awards*, if the entries warrant.

These well-known men will act as judges

Dr. Clarence H. Lorig, Technical Director, Battelle Memorial Institute and Past President American Society for Metals. Mr. John R. Daesen, Technical Director, American Hot Dip Galvanizers Association. Mr. John L. Kimberley, Executive Vice President, American Zinc Institute.

Anyone is eligible to enter

Anyone in the world (except members of the American Hot Dip Galvanizers Association and the American Zinc Institute, and their employees and advertising agencies) may submit one or more entries.

Business firms or corporations may submit entries under their business name, instead of as individuals, if they choose.

Entries will be considered by the judges promptly upon their receipt. No entry received after April 30, 1962 will be considered.

These are the kind of ideas we're looking for:

The Awards will be made for ideas pertaining to: (a) Applications of Hot Dip Galvanizing to a new or unusual field, or; (b) An improvement in application in fields where Hot Dip Galvanizing is now being used, or; (c) New methods of after-treatment of Hot Dip Galvanized products.

Each entry must contain:

(a) Description and documentation of application.

(b) Case history of the application or process accompanied by photo, drawings, formulae, etc.

(c) All technical data needed for the utilization of the idea submitted.

(d) Release of the application or idea for general use without payment or royalty other than the $1000 award.

Other conditions:

The decision of the judges will be final.

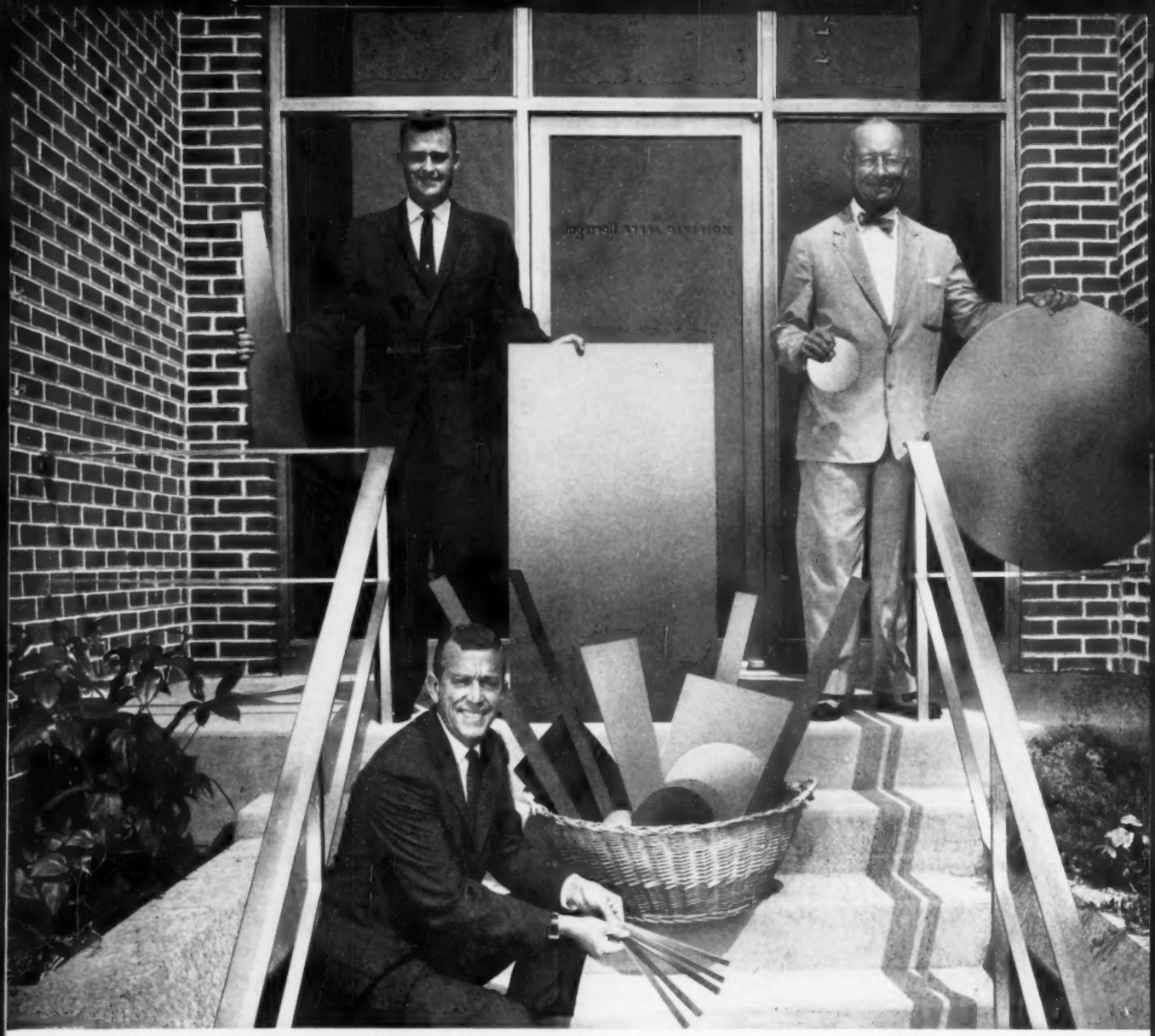
Award-winning ideas will be retained by the American Hot Dip Galvanizers Association for dissemination throughout industry. Other entries will be returned.

No formal entry blank is required. The entry should be accompanied by your name, address and business connection.

Entries should be sent to:

American Hot Dip Galvanizers Association, Inc.
5225 Manning Place, N. W.,
Washington 16, D. C.

Note: For information on galvanizing, write to the above address for name and location of the American Hot Dip Galvanizers Association member nearest you.



Bottom: R. W. Leigh, Vice President—Sales; top, l. to r.: R. H. Ingersoll, Steel Sales Engineer; G. M. Poole, Chief Metallurgist

Lay your saw steel problems on our doorstep

Ingersoll specializes in the melting and *cross-rolling* of metal and wood cutting saw steels for just about any purpose you can name. For power and hand hack saw blades; for circular saws (blanks to 72" in diameter); for slotting and slitting saws; and for many other types. In carbon, chromium, nickel, chromium-nickel, chromium-vanadium, chromium-nickel-molybdenum, low alloy metal cutting, and high speed (tungsten and tungsten-moly) grades. We maintain in-plant stocks for prompt service. And we provide expert metallurgical assistance to make sure you get the right kind of saw steel for your requirements. If you have a saw steel problem, lay it on our doorstep. Meantime, write for Ingersoll's new full-color brochure "*Experts in Specialty Steels.*"

Ingersoll makes and supplies saw STEEL—not SAWS

Ingersoll STEEL DIVISION

Borg-Warner Corporation

NEW CASTLE • INDIANA

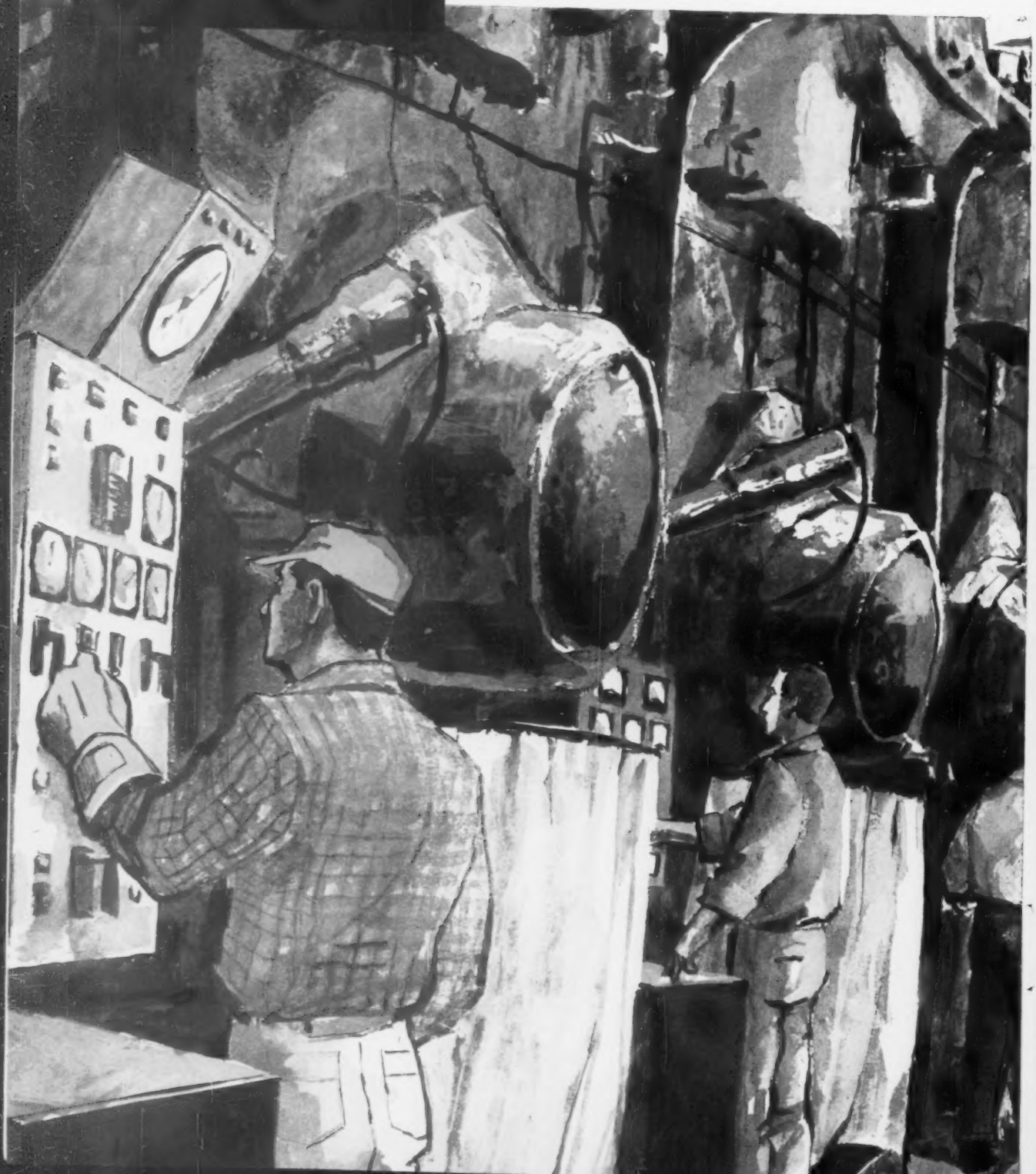
INGERSOLL B-W STEEL

BORG-WARNER

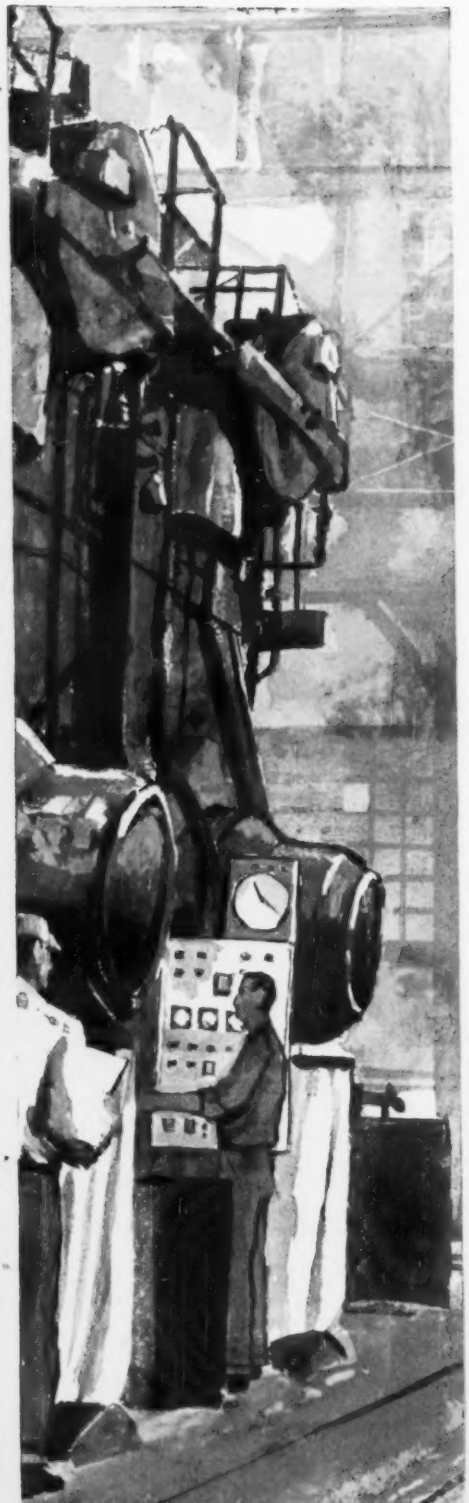
FOR QUALITY... PRODUCTIVITY ... PROFIT

METAL ROLLING
AUTOMATED BY GENERAL ELECTRIC

More steel producers to keep strip on-gage



turn to General Electric gage control automatically, increase yield per ton



To maintain strip gage . . . increasing output of saleable product . . . more and more steelmakers are using General Electric automatic gage controls. G-E gage control systems to be delivered in 1961 are equal in number to all automatic systems supplied since the first installation in 1955 . . . bringing to nearly 50 the number of General Electric designed systems in operation. Automatic gage control is another of many products and systems General Electric has pioneered in 75 years of developing and building equipment to help make metal rolling faster, more efficient, and more profitable.

Two automatic gage control systems . . . a cold-mill system first applied in 1955, and a hot-mill system successfully applied in 1958 . . . result in greater yield of usable strip per ton while reducing costly downtime resulting from less-efficient manual adjustment systems. Look at the benefits in these two key areas:

Higher quality strip—more uniform strip throughout because off-gage signal automatically activates corrective equipment . . . strip gets on-gage sooner, stays on-gage longer . . . more usable strip per ton.

Maintenance and downtime reduced—long-life, solid-state semi-conductors with no moving parts are used . . . "plug-in, plug-out" replacement of faulted parts permits full production during repair.

Let General Electric's experience in steel mill control, and leadership in automating all types of process control, help you in your modernization program or in your plans for new facilities. See your General Electric sales representative. For more details on gage control, write Sect. 785-14, General Electric Co., Schenectady, N. Y.

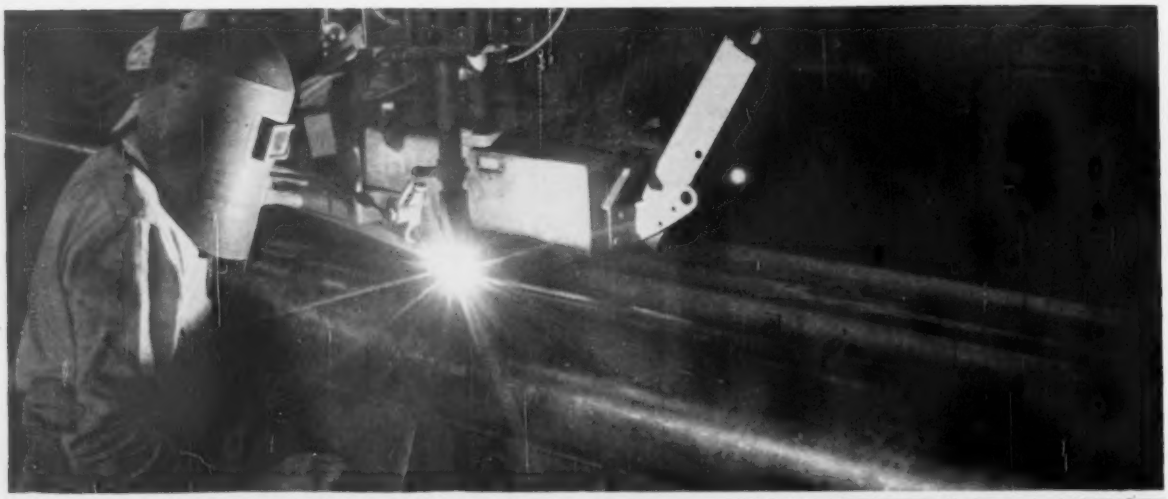
Industry Control Department, Salem, Virginia.

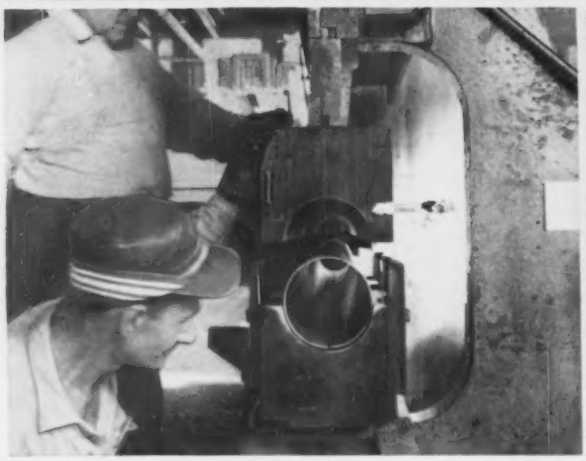
Progress Is Our Most Important Product

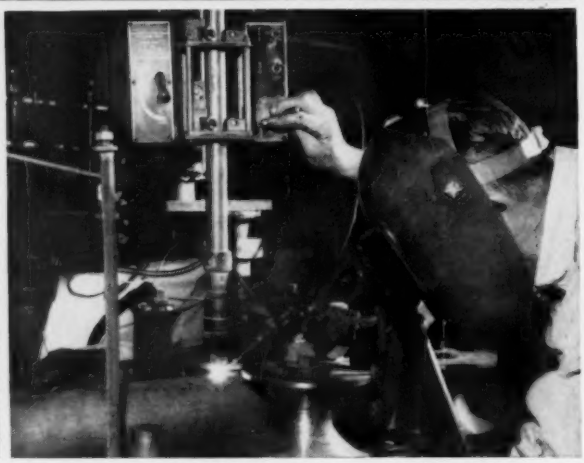
GENERAL ELECTRIC

AUTOMATIC GAGE CONTROL for either hot-strip mills (above) or cold-strip mills is just one of many automated systems designed and built by General Electric to help you meet increasing competition.

Weldability and formability of 90-10 Cupro Nickel are keys to durable salt water piping at moderate cost







Top: A 15-foot section of 12" diameter salt water piping fabricated from sheet Cupro Nickel, 10%-755 being welded at Welin Davit & Boat Division. **Left above:** A 4" diameter section of Cupro Nickel piping, first formed oval, is made perfectly round in this forming die. **Right above:** In a new mechanized setup, specially developed by Welin Davit for smaller tubes, a 4" diameter tube seam is welded by the TIG process using automatic filler wire feed.

Steadily growing use of 90-10 Cupro Nickel piping in marine, power plant and industrial applications – for salt water fire mains and cooling lines, even fuel lines – is due to a combination of several advantages: required corrosion resistance at moderate cost, ready formability, and good weldability.

Tube section pressed flat at weld shows no breaks or cracks. This test demonstrates quality of welds achieved. All 70-30 and 90-10 Cupro Nickel piping made at Welin Davit meets Specification MIL-T-16420F (SHIPS), July 1960.

Outstanding corrosion and erosion resistance of 90-10 Cupro Nickel salt water piping assures long, trouble-free service life, even at relatively high rates of flow. Higher strength of 90-10 Cupro Nickel permits use of lighter wall thicknesses than are required for copper and results in significant weight savings.

All this adds up to economy in fabrication . . . ease in installation . . . and minimum maintenance – less cost overall!

The Welin Davit & Boat Div. of Continental Copper & Steel Industries, Inc., Perth Amboy, N. J., whose name is synonymous with lifeboats and davits, has enlarged its facilities to meet the growing demand for piping of 90-10 Cupro Nickel alloy–which provides, to a high degree, the advantages of 70-30 Cupro Nickel at relatively moderate cost. It produces the piping from sheet and strip in lengths up to 15′ and in diameters from 4" to 15" O.D. Wall thicknesses range from .095" to .500" depending on the service and diameter.

FOR TECHNICAL ASSISTANCE in the selection of the best alloy to do a job, and in the welding or joining of copper and copper alloys, see your Anaconda representative. Or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass, Ltd., New Toronto, Ont. 6184

ANACONDA®
COPPER AND COPPER ALLOY MILL PRODUCTS
Anaconda American Brass Company

New Money Makers for Industry:

KIN TEL CLOSED CIRCUIT TV SYSTEMS

what they are, and what they can can do for you...

What is a KIN TEL Closed Circuit TV system?

The basic KIN TEL closed circuit TV system consists of a camera, camera control unit, and monitor, each connected by cable. The camera can be located at great distance from the monitor, and any number of monitors may be used to display the same picture.

Cameras are small enough to hold in your hand; rugged enough to operate in virtually any environment; versatile enough to cover (via remote control) almost any area; and sensitive enough to provide excellent pictures of subjects illuminated by a single candle.

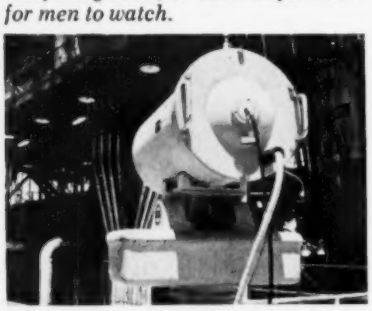
The camera control provides automatic operation. The system is continuously self-adjusting for wide variations in light levels (several thousand to one), and features automatic high definition of bright objects. The only control you have to touch is the on-off switch.

The monitor displays a crisp, clear picture...full 650-line resolution, twice that of the best home TV reception.

How are such systems used?

Today, KIN TEL TV systems are performing a number of jobs for *hundreds* of firms, safely, inexpensively, tirelessly.

They are being used to watch operations or events that are tedious, difficult, dangerous, or even impossible for men to watch.



For example: Convair (above), Douglas, Lockheed and Northrop watch rocket tests with KIN TEL systems. U.S. Steel uses one to see inside open hearth furnaces. Westinghouse watches nuclear power reactor tests with one.

They are being used for surveillance.

For example: The San Francisco Naval Shipyard uses one to guard against pilferage.

They are being used for traffic control.

For example: The Alameda Naval Air Station uses a KIN TEL TV system to observe aircraft landings on the portion of the runway that is not visible from the control tower.

They are being used to transmit visual information quickly and accurately; for remote observation of charts, meters, graphs, schedules, blueprints, photographs, images from microscopes, fingerprints, signatures...the list is almost endless.

For example: E. F. Hutton uses a KIN TEL system to transmit stock market quotations to the offices of the firm's executives. The Los Angeles Department of Water and Power uses one for remote viewing of water-level meters. The University of California teaches physics with one.

They are being used for monitoring any operation that normally requires standby personnel.

For example: American Potash and Chemical (above) monitors conveyor line and warehousing operations with a KIN TEL TV system.

Why do these firms choose a KIN TEL system?

For a variety of reasons.

First, *reliability.* KIN TEL TV is designed for continuous duty operation in severe environments. Day in and day out, it keeps working. It's the first choice for ICBM and other missile programs that really depend on TV, that can't chance failure, that can't afford to compromise with reliability.

Second, *picture quality.* KIN TEL TV presents clear, sharp pictures. Full 650-line resolution provides maximum data...essential for *quantitative* observation of complex operations or transmission of printed material.

Third, *automatic operation.* KIN TEL TV is the only closed circuit system that provides entirely automatic, through-the-lens compensation for light-level changes of several thousand to one.

Fourth, the KIN TEL closed circuit TV system is extremely *sensitive.* The light required to read this page is enough for sharp clear pictures, and usable pictures can be provided with less than one-foot candle illumination.

Fifth, KIN TEL TV systems are *easy to install* and *simple to operate.* With no changes in lens iris to make, with no difficult, interacting electrical adjustments required, the only thing the operator has to know is the location of the on-off switch.

Sixth, a *complete* line of shelf-item system components and a variety of cameras and monitors make virtually any application feasible...permit observation of nearly every kind of operation, under all kinds of conditions.

For example, with system components, you can remotely position the camera, remotely select one of several lenses, remotely "zoom" in or out for closeup or wide-angle viewing, operate the camera in extremes of temperature or in explosive or dusty atmospheres, view microscope images. Whatever your viewing problem, KIN TEL probably has a *stock* solution.

Seventh, you don't have to waste your time and money on application engineering. At no obligation to you, KIN TEL's nationwide factory-trained field engineers – thoroughly experienced in optics, environmental requirements, lighting, cabling, human engineering factors, and other installation considerations – can determine whether or not closed circuit TV can be put to profitable use in your intended application.

What can a KIN TEL system do for your business?

It can do what it is doing right now for hundreds of other firms. It can save you time and money...increase efficiency...better your service to clients and customers. To find out how, write direct for catalog 6-205 and the name of your nearest KIN TEL engineering representative.

KIN TEL
A DIVISION OF
COHU
ELECTRONICS, INC.

5725 Kearny Villa Road, P. O. Box 623, San Diego 12, California, BRowning 7-6700

KIN TEL – pioneer and leader in closed circuit television.

"Fitness report" with hundreds of identical copies

Armco Steel Corp. ✓
The Babcock & Wilcox Co., Tubular Products Div. ✓ ⊥
The Carpenter Steel Co., Alloy Tube Div. ⊥
Jones & Laughlin Steel Corp., Electricweld Tube Div. ✓
National Tube Div., United States Steel Corp. ✓
Ohio Seamless Tube Div., Copperweld Steel Co. ✓
Republic Steel Corp., Steel and Tubes Div. ✓ ⊥
Revere Copper & Brass Inc., Rome Mfg. Co. Div. ✓ ⊥
Sawhill Tubular Products, Inc. ✓ ⊥
Southeastern Metals Co. ✓
The Standard Tube Co. ✓ ⊥
Superior Tube Co. ⊥
Trent Tube Co., Subs. Crucible Steel Co. of America ⊥
Union Steel Corp. ⊥
Van Huffel Tube Corp. ✓
Wall Tube & Metal Products Co. ⊥

⊥ PRODUCES WELDED STAINLESS STEEL TUBE
✓ PRODUCES WELDED CARBON STEEL TUBE

Here's the reason why you can count on welded carbon or stainless steel tubing in critical heat transfer applications: its method of manufacture, developed to high domestic standards, results in consistently reliable performance. Starting with clean, scale-free flat rolled steel the resulting tube surfaces are smooth, and free from scratches and pits. You are assured of concentricity, exact O.D. and I.D., precise wall thickness, and uniform ductility for bending or rolling in operations.

Whether you require carbon or stainless steel analyses, listed here are the quality welded tube producers ready to serve you. It will pay you to contact any of them or write for free Booklet 8591, Department IA-3, Welded Steel Tube Institute, Inc., Hanna Building, Cleveland 15, Ohio.

261

WELDED STEEL TUBE INSTITUTE, INC.

Think Profit . . .

HOLO-KROME THERMO-FORGED* SOCKET SCREWS HELP INCREASE PROFITS BY REDUCING INSPECTION REJECT AND IN-WARRANTY SERVICE COSTS

Join other profit-conscious industrial leaders in taking a long, hard look at the profit-eating costs of inspection rejects and in-warranty service. You'll see why they're turning to *quality*—in materials and components—to reduce costs and increase profit.

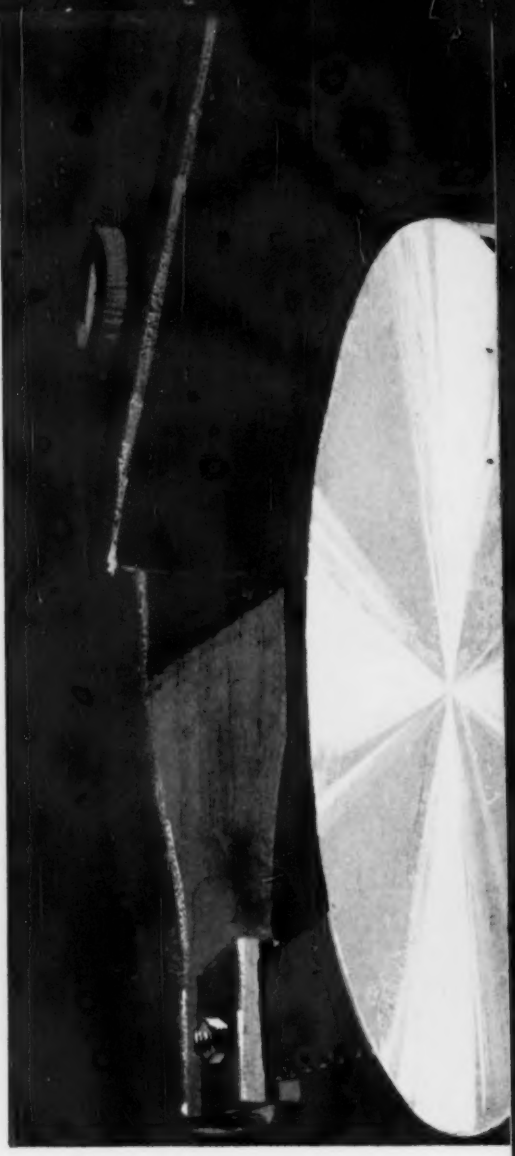
Holo-Krome's exclusive THERMO-FORGED process produces socket screws of unmatched uniformity and quality . . . virtually free from flaws and hidden imperfections. Next time you order socket screws, think of *final* cost *first*. A few extra pennies spent on *quality* will save many hundreds of profit dollars by reducing the high cost of inferior fasteners.

Like full details on how Holo-Krome quality can help increase your profit? See your authorized Holo-Krome distributor, or write for more information.

**Trade Mark of The Holo-Krome Screw Corporation*

HOLO-KROME
*Thermo-Forged**
SOCKET SCREWS
SOLD ONLY THROUGH AUTHORIZED HOLO-KROME DISTRIBUTORS
THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.

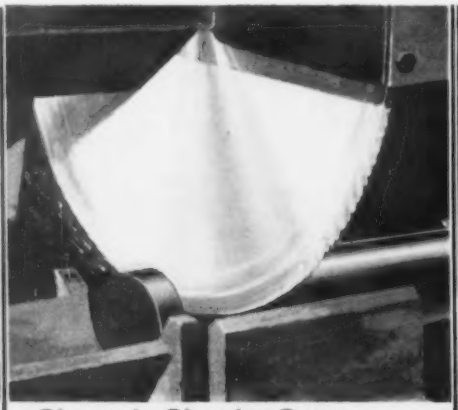
SIMONDS MEANS SAVINGS WHATEVER YOU CUT



Now Change from

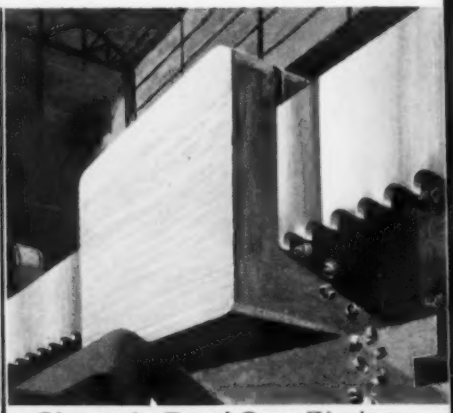
"Red Tang" Files

For faster, easier filing, Simonds "Red Tang" Files are sharper to start with, hog off more metal per stroke. More wear-resistant, too, they keep on cutting long after other files have turned dull and useless.



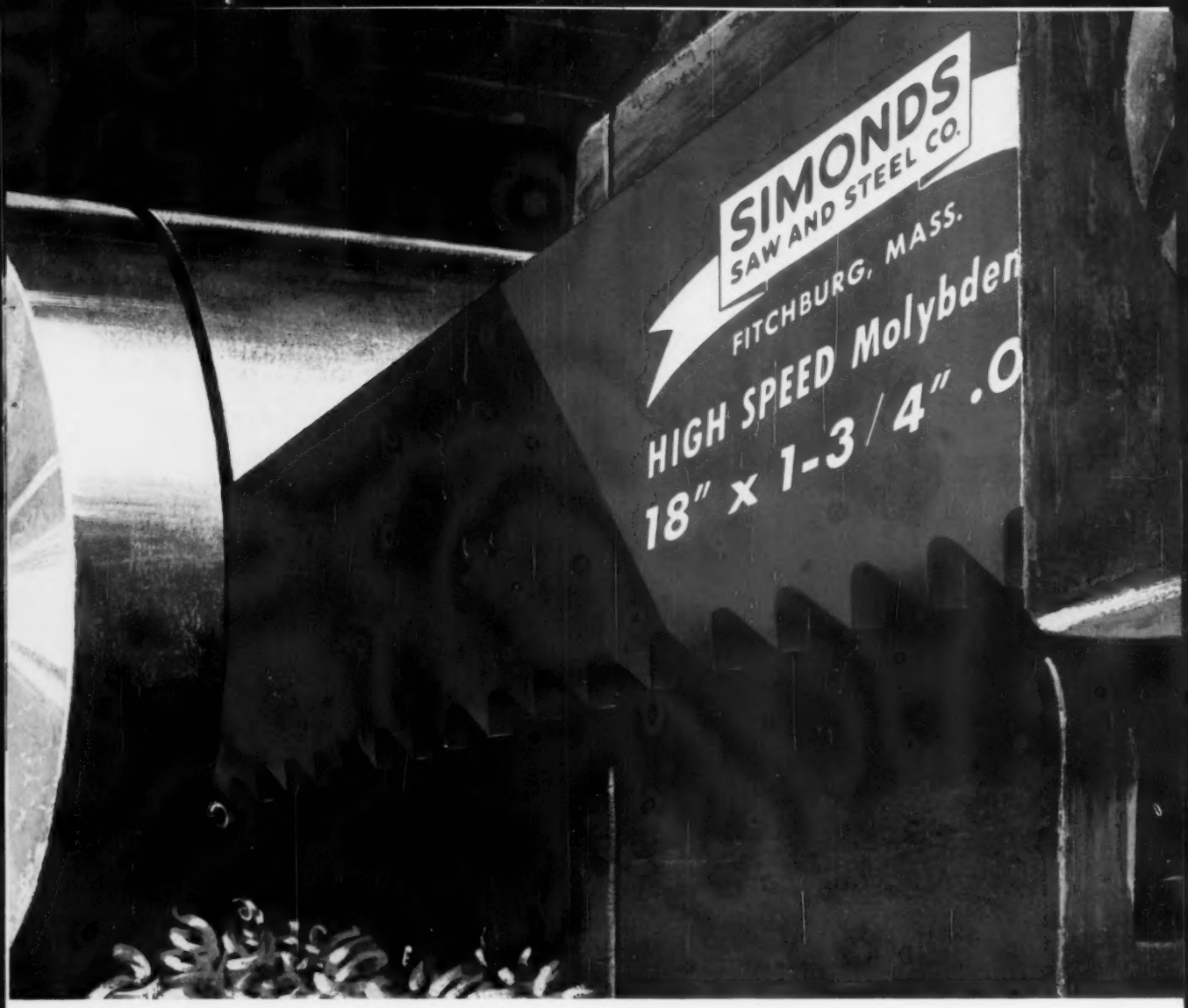
Simonds Circular Saws

Tops for fast, straight cutting. Simonds Saws are designed and made to stay on the job longer. Available in 5 types: Solid Tooth, Hard Rim, Inserted Tooth, Segmental and Carbide Tipped — for lowest cost cutting of all kinds of metal.



Simonds Band Saw Blades

Our new "Super" High Speed Steel Band will give you up to 3 times better performance than any other high speed steel blade you're now using. It's a startling new advance that can substantially reduce your cutting costs.



Hacking to Cutting...

with Simonds "Red End" Hacksaw Blades

Important Cutting Fact! Simonds big "Red End" Hacksaw Blades cut curled *chips* like the cutting tool on a lathe.

Result? You cut faster, you cut straighter — get more work done in far less time.

What's more, Simonds blades are made from tough, cross-rolled steel . . . steel that *stays sharp* longer, resists *breakage*, gives you *many more cuts* per blade!

But don't take our word for it. Test a box of 10 Simonds "Red End" Blades against any 10 others. See for yourself how Simonds will up your cutoff production, lower your blade costs.

Simonds "Red End" Power Blades come in All-Hard and Shatterproof types in all standard lengths, thicknesses and tooth spacing . . . a "right" blade for every job.

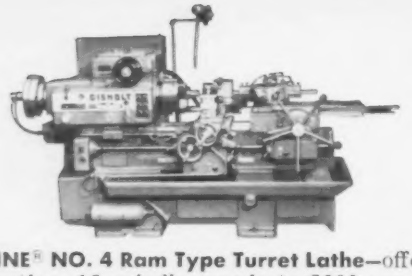
Three types of Hand Blades are also furnished in all standard specifications for easier cutting, longer life and lower costs. Call your local Simonds Distributor for prompt delivery or further details.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASSACHUSETTS

Buy through your local Simonds Distributor for TRIPLE-S SERVICE — Local Stocks – Local Speed – Local Skill

Factory Branches in Union, N. J., Chicago, Shreveport, La., Los Angeles, San Francisco, Portland, Ore. • Canadian Factory in Granby, Que. • Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.; Heller Tool Co., Newcomerstown, Ohio; Simonds Abrasive Co., Philadelphia, Pa. and Arvida, Que., Can.

SOMEBODY *is doing it for* LESS



MASTERLINE® NO. 4 Ram Type Turret Lathe—offers fast, easy operation, 16 spindle speeds to 2000 rpm and 25 hp driving motors for maximum metal removal with carbides.

Simplified controls, tracers for complex jobs (shown) and operator-oriented design permits handling short run work at minimum cost in time, labor and tooling.

Contact your Gisholt Representative or write for Catalog 1174-E.

Things can get pretty hot in a job shop.

Competition forces you to quote new machine rates. Yet, if you're average, over 60% of the ram type turret lathes in your shop are 10 years old. They're only half as efficient as today's models.

It's easy to see how profits . . . and contracts can be lost.

There is only one answer . . . replace old with new. Find out now, how Gisholt Ram Type Turret Lathes can help you do it for less.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers® • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

This
is
AMERICAN
OIL
COMPANY

May we introduce ourselves...

AMERICAN

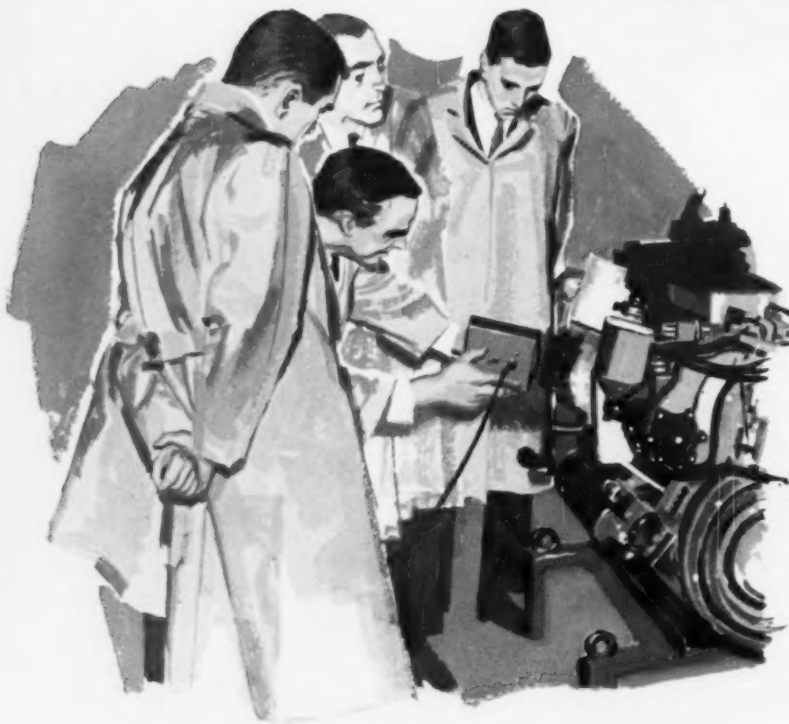
American Oil Company is our name. Our organization has more than 70 years' experience in the oil business. We are one of the largest petroleum organizations in America. We believe the experienced American Oil representative who calls on you, plus the products and facilities which he has at his disposal, are reasons why you will like to do business with us.

The American Oil Company representative that calls on Industrial and Fleet customers has many years of experience in this work. Because of this experience and background, he knows your petroleum product needs. He has more than 2,000 products with which to fill these needs.

Meet your American Oil representative...

SPECIALISTS back-stop representatives

In the American Oil Marketing Technical Service Department are specialists who are recognized authorities in their fields. These senior consultants may be called in to work with you on any specialized problem you may have.

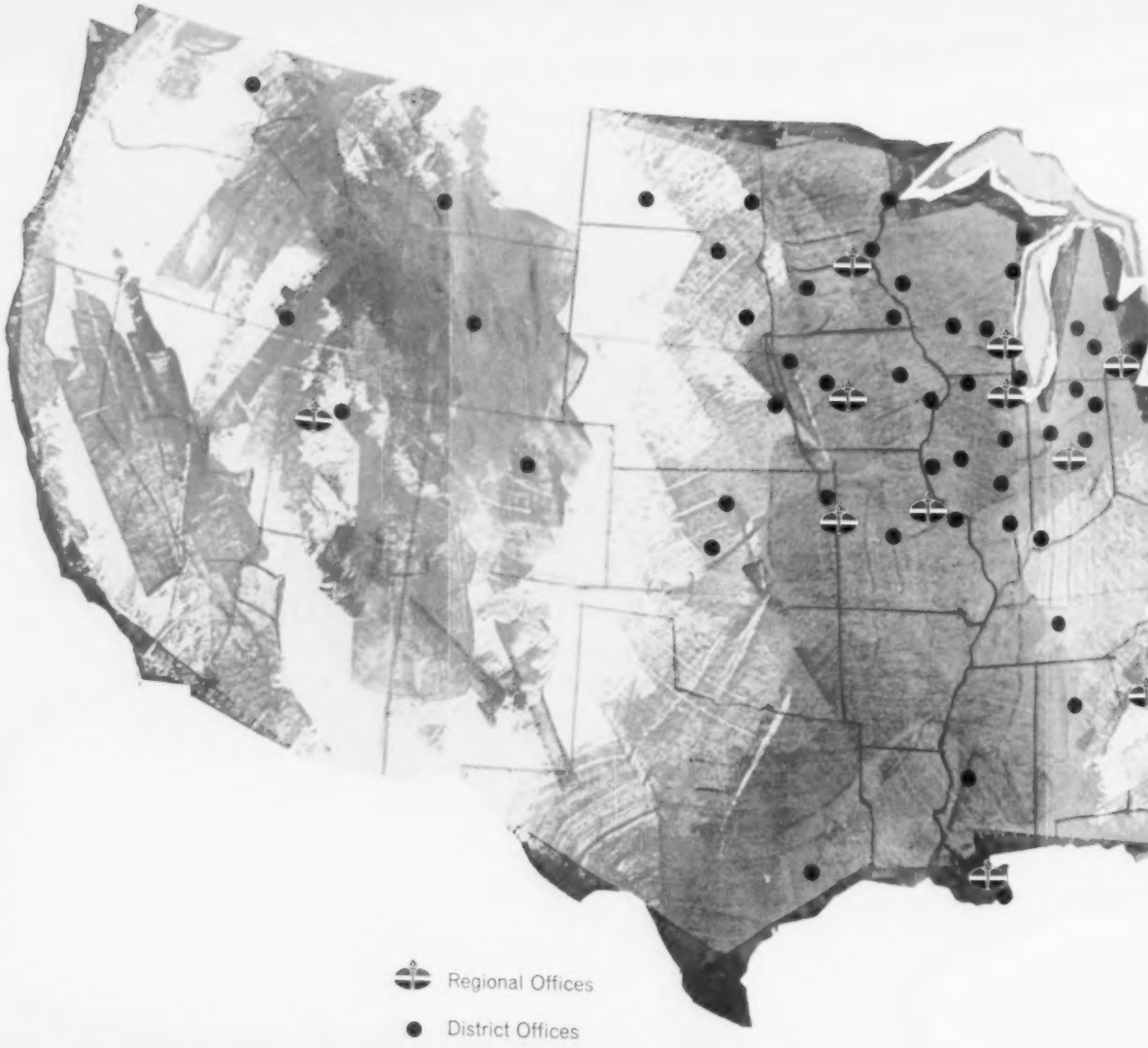


RESEARCH

Our research center adjacent to our refinery at Whiting, Indiana, is one of the largest in the world. More than a thousand research scientists and technicians are at work here developing new products and finding ways to improve present products. Their mission: To help your American Oil representative help *you* lower your maintenance costs and stretch your maintenance dollars.

TRAINING at American's Sales Engineering School

In our Sales Engineering School your American Oil representative receives special training. In concentrated courses of instruction he is given basic information covering all phases of petroleum product quality and application. According to a planned schedule, he returns for an advanced course and then again for post-graduate work.



Your representative is always nearby

American Oil repre
from 74 District
Region l Offices st
throughout the cou
to Dist ct Offices.
Compan represent
phone c l from you
ucts yo need for
are av ble from
wareh ses and c
mainta d to prov

AMERICAN OIL COMPANY

Speed and flexibility of service begin at the refinery

Twelve American Oil refineries give flexibility to production, make it possible to assure prompt delivery. Our 2,875 miles of product pipelines augment delivery facilities.

arby

representatives operate
rict Offices. Thirteen
ces strategically located
e country lend support
ffices. An American Oil
esentative is only a tele-
m your office. The prod-
d for your plant or fleet
from upwards of 4,100
and distribution points
provide quick delivery.

PRODUCTS available from American Oil Company

Your American Oil representative has a line of more than 2,000 products. Here are some of his most important ones . . .

Metal Refining and Metalworking Industries	**AMOCUT Oils** Cutting oils for every type of machining operation.
	AMERICAN Industrial Oils Lubricating oils for many purposes.
	AMOCOOL HD Soluble Oil Heavy-duty soluble oil.
	RYKON Greases For every grease-lubricated bearing.
	Anhydrous Ammonia & Nitrogen Solutions
Mining Industry	**AMERICAN Diesel Fuel** Premium quality, multi-purpose.
	AMERICAN HD-M, S-1, S-3 Motor Oils Heavy-duty motor oils.
	AMERICAN Industrial Oils For general mine lubrication.
	AMERICAN Regular Gasoline For heavy-duty operation.
	AMOVIS Lubricants For gears and cables.
	RYKON Greases For every grease-lubricated bearing.
Dairy Industry	**ESKAR Dairy Waxes** Premium quality dairy waxes.
Process Industries Chemical Food Paper	**AMERICAN Industrial Oils** Circulating compressor and hydraulic oil.
	AMODRIP Oils Premium quality dripless oils.
Process Industries *(continued)*	**ESKAR Waxes** All-purpose paper-coating waxes.
	RYKON Greases For every grease-lubricated bearing.
	Anhydrous Ammonia & Nitrogen Solutions
Power Generation	**AMERICAN Diesel Oils M** Premium "MIL" diesel lubricating oil.
	AMERICAN Diesel Fuel Clean-burning premium diesel fuel.
	NONPAREIL Turbine Oil Guaranteed for the life of the turbine.
	AMERICAN D&G Oils Premium S-1 level lubricating oil for diesel and gas engines.
Truck, Bus and Construction Equipment	**AMERICAN Diesel Fuel** Clean-burning premium diesel fuel.
	AMERICAN HD-M, S-1, S-3 Motor Oils Heavy-duty motor oils.
	AMERICAN Regular Gasoline For heavy-duty operation.
	AMOCO Lithium Multi-Purpose Greases All-purpose greases.
	Super PERMALUBE Grease Anti-rust, high-load carrying chassis grease.
Railroads	**Diesel Fuels and Lubricants**
Fertilizer Manufacturers	**Anhydrous Ammonia & Nitrogen Solutions**
For Road Construction and Industry	**Asphalt Products** Complete line.

And for fleet men,

AMERICAN'S outstanding Truck Stop Program

A network of more than 170 American Oil Truck Stops serve fleet operators. Twenty-four hour service, repair services, simplified bookkeeping and other advantages come to fleet men who route their trucks to these stations.

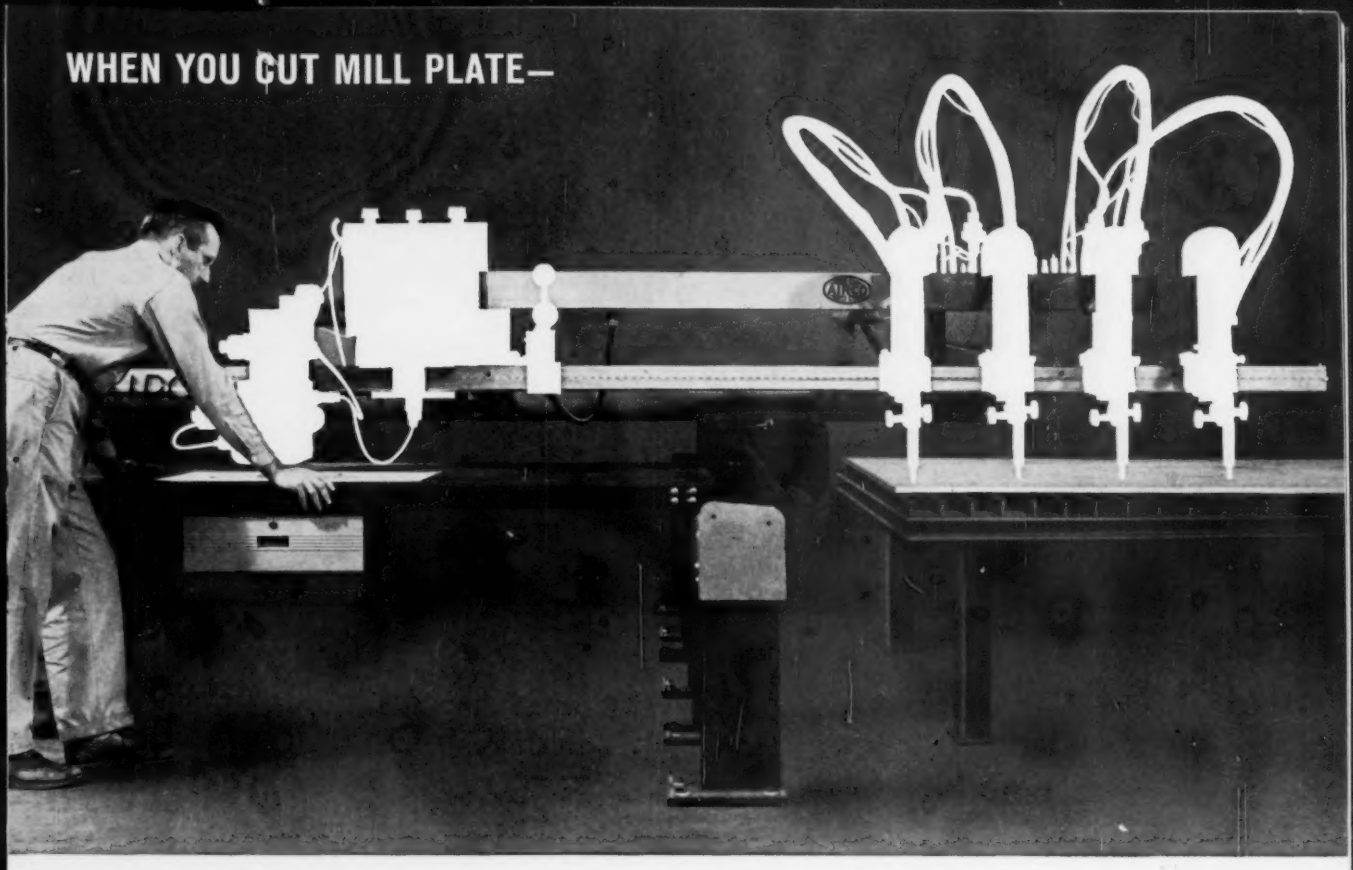
AMERICAN

OIL

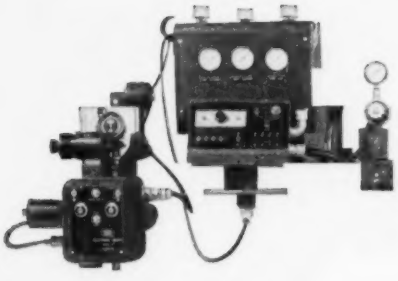
COMPANY

910 S. Michigan Ave., Chicago 80, Ill.

WHEN YOU CUT MILL PLATE—



AIRCO'S NATURAL GAS FLAME CUTTING SYSTEM OFFERS EVERYTHING YOU NEED



Above: new Airco Linagraph. Airco produces every type of flame cutter — from portables to advanced large automated systems.

Cutting bull gear blanks, ship plates, hangers, machine frames, or any other shape?

Equip with an Airco natural gas flame cutting system. You'll cut at lower cost. You'll reduce warpage. You'll cut so precisely that most pieces need no finishing. Moreover, the Airco system will work even when gas service pressure is low.

Main reasons why:

(1) Only Airco natural gas flame cutting systems are built from a component line that is complete and matched. Exact needs are met.

(2) Multi-torch Airco machines are based on the exclusive pantograph design. Tracing head moves only torches and gas system; carriage is driven independently. No extra burden here.

Airco makes everything you need for your natural gas flame cutting operation. Call Airco—*where the big idea is teamed with unexcelled research and experience.*

AIRCO®

AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated
150 East 42nd Street • New York 17, N. Y.
More than 700 Authorized Airco Distributors Coast to Coast

On the west coast—Air Reduction Pacific Co., Internationally—Airco Co. Int'l., In Canada—Air Reduction Canada Ltd. • All divisions or subsidiaries of Air Reduction Co., Inc.

How George Deickert upped grinding

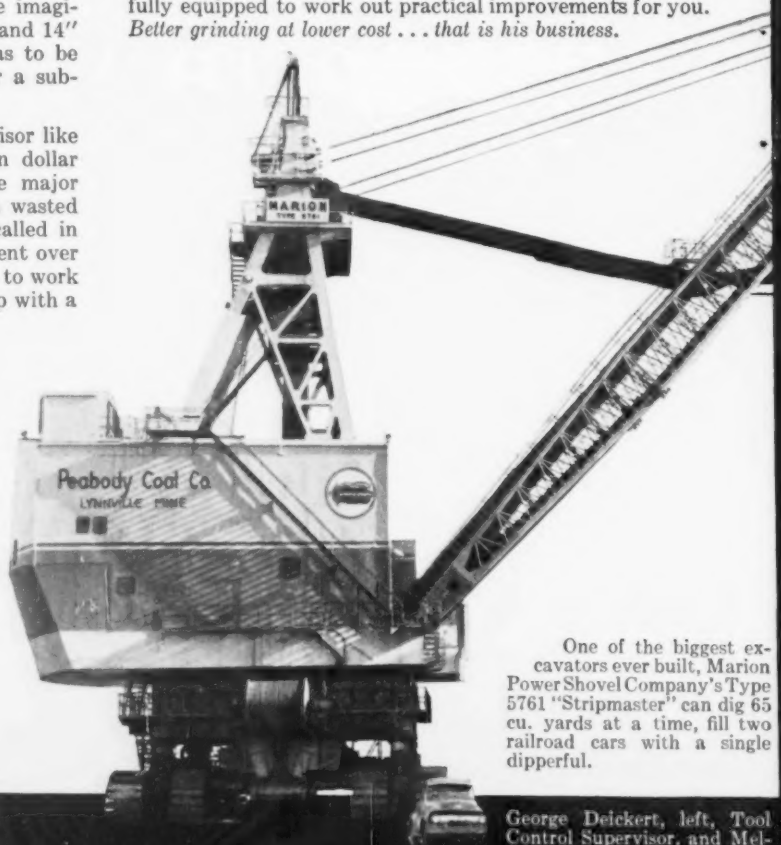
Watchmakers have nothing on the builders of Marion power shovels as far as accuracy is concerned. Some of the shafts on Marion's biggest shovel (two full carloads in a single scoop!) have to be finished to a tolerance of ±.0004" on bearing surfaces.

The sheer size of these grinding jobs staggers the imagination too. The steel shafts run up to 12 ft. long and 14" in diameter so a tremendous amount of metal has to be removed and the grinding operation accounts for a substantial chunk of costs.

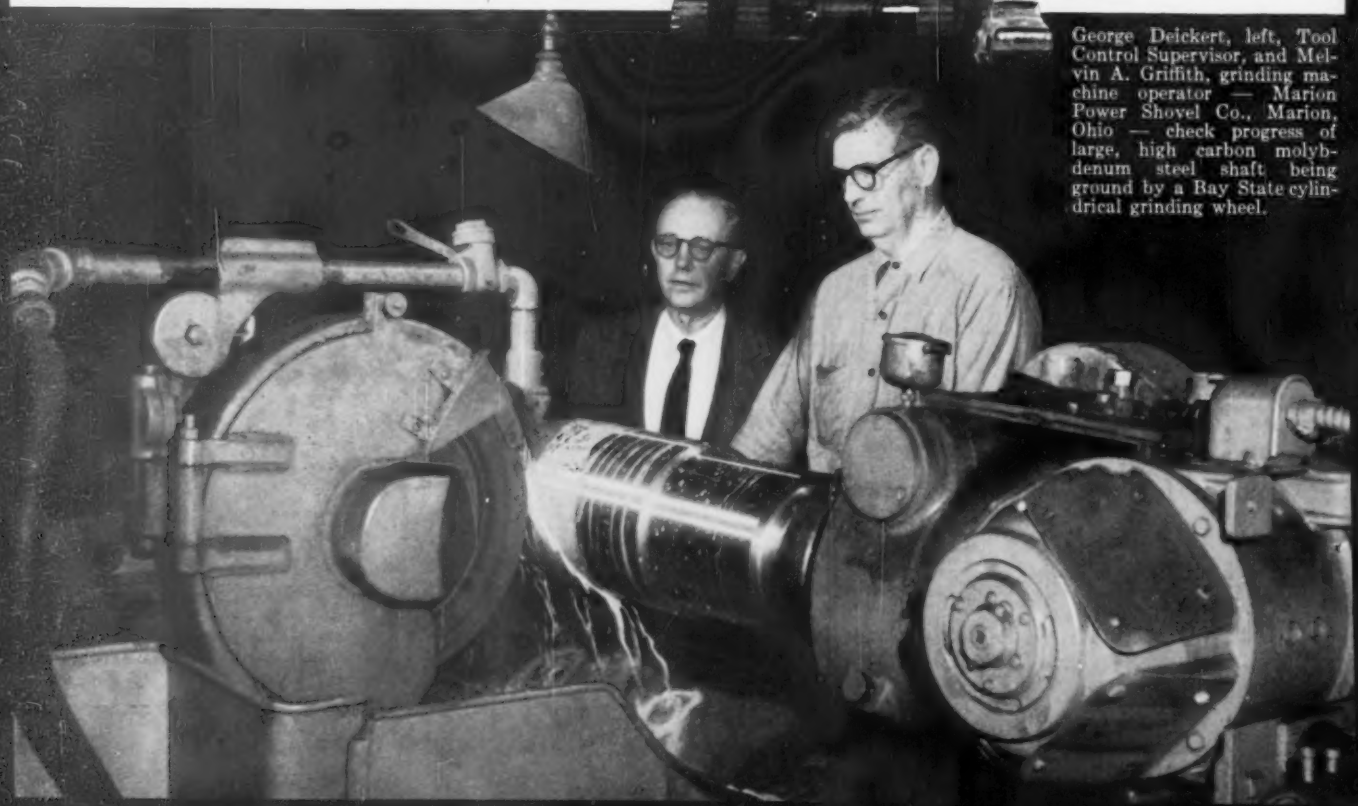
That's where an outstanding Tool Control Supervisor like Marion's George Deickert is worth his weight in dollar bills. His analysis of the situation showed five major deficiencies in the wheels used for the job and he wasted no time turning dissatisfaction into action. He called in Bay State Abrasive Specialist Dick Crofoot and went over the whole problem with him in detail. Crofoot went to work with the engineering staff at Westboro and came up with a specification that did both grinding and finishing *and* ensured: (1) 30% faster stock removal. (2) Excellent instead of poor size control . . . *easily within* the ±.0004" tolerance. (3) Consistent finish at 20 RMS. (4) 50% less dressing. (5) Greatly improved wheel life. (6) Consistent duplication of performance, wheel after wheel.

As George Deickert himself says: "This isn't the only job that Bay State has done well on for us. We have dozens of different types of grinding jobs . . . and we use a great many different types of wheels, including tool wheels. Bay State not only does a lot of jobs for us and does them well . . . they have also been able to duplicate excellent first performances with their follow-up wheels."

If your grinding operations . . . large, small or micro-miniature . . . are less than 100% efficient by current standards of abrasive technology, your Bay State distributor or direct representative is thoroughly trained and fully equipped to work out practical improvements for you. *Better grinding at lower cost . . . that is his business.*



One of the biggest excavators ever built, Marion Power Shovel Company's Type 5761 "Stripmaster" can dig 65 cu. yards at a time, fill two railroad cars with a single dipperful.



George Deickert, left, Tool Control Supervisor, and Melvin A. Griffith, grinding machine operator — Marion Power Shovel Co., Marion, Ohio — check progress of large, high carbon molybdenum steel shaft being ground by a Bay State cylindrical grinding wheel.

speed 30% and cut dressings by 50% at MARION POWER SHOVEL

George Deickert's background is impressive to put it mildly. His technical training started in Germany with a Masters Degree in steam and combustion engineering from Berlin University. His business career includes hitches with United Carbon Co., and Weston Instrument Co., in Newark, N. J. and fifteen years with Curtiss-Wright in Patterson, N. J. Starting as a Methods Engineer, he's been with Marion Power Shovel since 1947. He has used Bay State wheels since 1932 and says they have never let him down.

BAY STATE ABRASIVES

BAY STATE
WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

Take a lead from the leaders...

Since 1948, Amchem ALODINE* treated over 1½ Billion square feet

Popular Reynolds Colorweld pre-finished aluminum panels find wide application in commercial construction where its enduring performance and good looks are helping to change the architectural face of industry. Alodine contributes its protective qualities to Colorweld's amazing paint performance.

Conversion Coating Chemicals have of Aluminum in Reynolds Plants!

From 1955, when Reynolds Colorweld** Production was started, Reynolds has used ALODINE; Continue to Report Complete Customer Satisfaction with Paint Adhesion on this Quality Pre-Enameled Aluminum Product

At two Reynolds producing facilities—Atlanta, Ga. and McCook, Ill.—Alodine chemicals used in the pre-paint treatment of Colorweld offer a typical example of Reynolds' continuing emphasis on product quality.

Each day at these plants thousands of feet of aluminum are treated with Alodine to provide the metal with a chemical coating which produces high quality paint bonding characteristics so essential to the durable Colorweld finish Reynolds demands.

Alodine provided the first economical treatment that made possible the mechanical forming of pre-painted aluminum. Under extremely high volume processing speeds, the outstanding attributes of Alodine benefit aluminum products of all types—through improved paint bonding for subsequent mechanical forming operations, that means extra years of wear for painted aluminum under all types of environmental conditions.

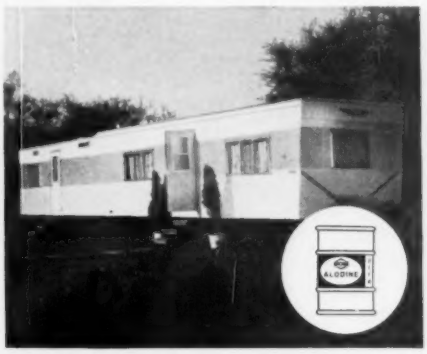
Behind the success of Alodine as the outstanding pre-paint treatment for aluminum stand the research and development activities of Amchem's Metal Protection Laboratories where the search continues for even more efficient aluminum treating chemicals.

Take a lead from the leaders. If you're producing aluminum—bare or coated—specify Alodine for the assured quality and added beauty of your finished product.

*Amchem's registered trademark for its conversion coating chemical for aluminum.

**Colorweld is a registered trademark of the Reynolds Metals Company.

Beauty and durability characterize siding of Reynolds Aluminum Colorweld for home use. Alodine chemicals help provide a paint bond that lasts and lasts.



This home-on-wheels has more appeal, will last longer thanks to its body of Reynolds Aluminum Colorweld, and a firm paint bond thanks to Alodine.

At Amchem's Metal Protection Laboratories exhaustive quality control testing assures the performance of Alodine chemicals for every aluminum pre-paint requirement.

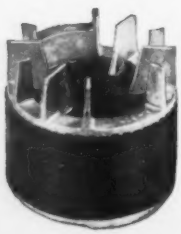
AMCHEM **ALODINE**

Amchem is a registered trademark of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)
AMBLER, PA. • St. Joseph, Mo. • Detroit, Mich. • Niles, Calif. • Windsor, Ont.

Write for Bulletin 1421C, gives detailed technical specifications on different Alodine chemicals available for pre-treating aluminum.

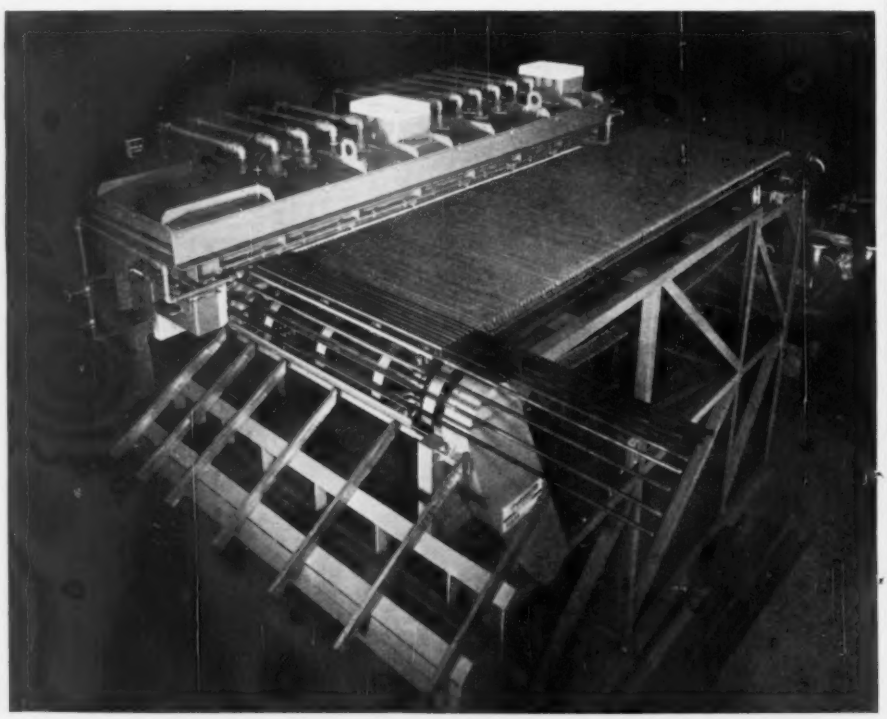
NEW SLANTS ON HEAT PROCESSING FROM SELAS

here's how industry cuts costs... Selas Heat Processing

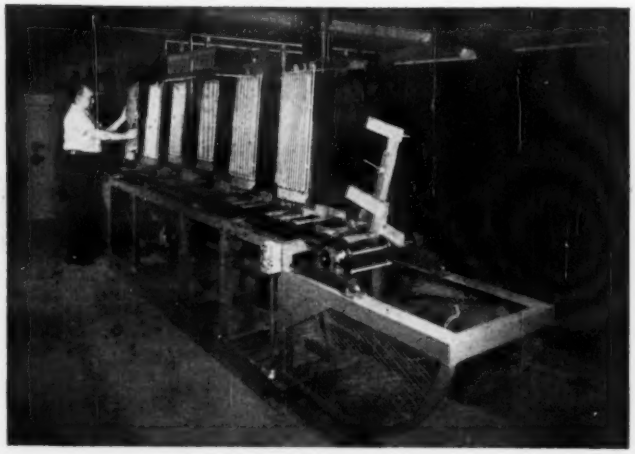


POST HEATING: *Die-cast aluminum rotors for electric motors are post-heated in this continuous, automated Selas machine, to improve electrical characteristics. Occupying floor area only 7 feet square, this machine provides also a fast, convenient method for shrink-fitting rotors to shafts, and replaces both manual heating and a press-fitting operation.*

HEATING FOR HOT WORKING: *End-heating prior to hot heading, this Selas automated machine heats 5 inches at one end of steel bars, ¾-inch diameter by 108 inches long, to 2200° F. quickly, uniformly, and with a sharp heat line. This equipment has enabled its user to double his production rate to 2640 pieces /hour without additional labor.*

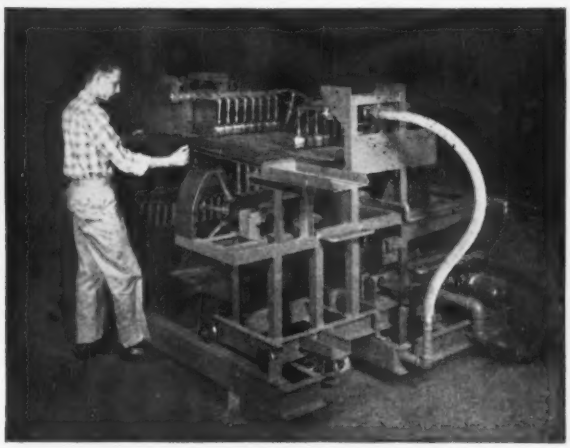


improves product quality with Equipment



BRAZING AND SOLDERING: *An automotive product operation requires the aluminum soldering of aluminum return bends to aluminum flared tube ends of finned condenser coil assemblies. This Selas automated continuous straight-line unit uniformly solders 180 assemblies/hour in six different intermixed sizes.*

SELECTIVE HARDENING: *Baking pan grouping strips of SAE #1025 formed steel are selectively hardened on this continuous, compact Selas machine. Complete with integral water-spray quench, it occupies an area approximately 6 x 7 feet and processes 1200 pieces/hour.*



These installations are typical of how Selas *automated* heat processing equipment

- Cuts operating costs
- Increases production rates
- Minimizes in-process inventory
- Reduces labor requirements
- Saves valuable floor space
- Improves product quality

Specifically designed and custom-built to meet your individual production requirements and job specifications, Selas automated heat processing equipment employs time-proven standardized engineering features for longtime operating dependability and minimum initial investment. A Selas field engineer would welcome the opportunity to survey your requirements . . . at your convenience. No obligation, of course. For this free personal service, or for literature on any of the heating operations shown here, write to Mr. W. B. Troupe, General Industry Division.

SELAS CORPORATION OF AMERICA
15 Dreshertown Road, Dresher, Pa.

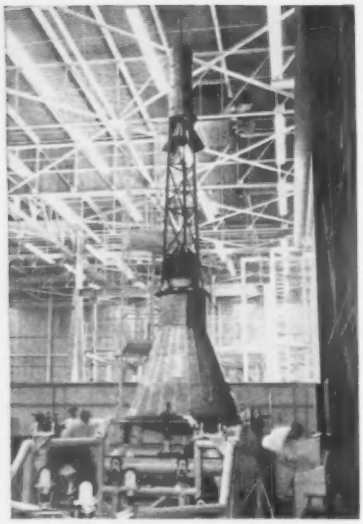
EUROPEAN SUBSIDIARY: Selas Corporation of America, European Div., S.A., Pregny, Geneva, Switzerland. **INTERNATIONAL AFFILIATES: FRANCE**—Societe Exploitation de Produits Industriels, Paris; **JAPAN**—International Machine Co., Ltd., Tokyo. **BENELUX, PORTUGAL, SPAIN**—Union Chimique, Brussels.

SELAS

HEAT AND FLUID PROCESSING ENGINEERS

DEVELOPMENT
•
DESIGN
•
CONSTRUCTION

WITH MAN IN SPACE



McDONNELL AIRCRAFT CORPORATION, Lambert Field, St. Louis, Missouri, is prime contractor for the Mercury Capsule, under the direction of the National Aeronautics and Space Administration. Photo shows capsule similar to the FREEDOM VII used in successful launch.

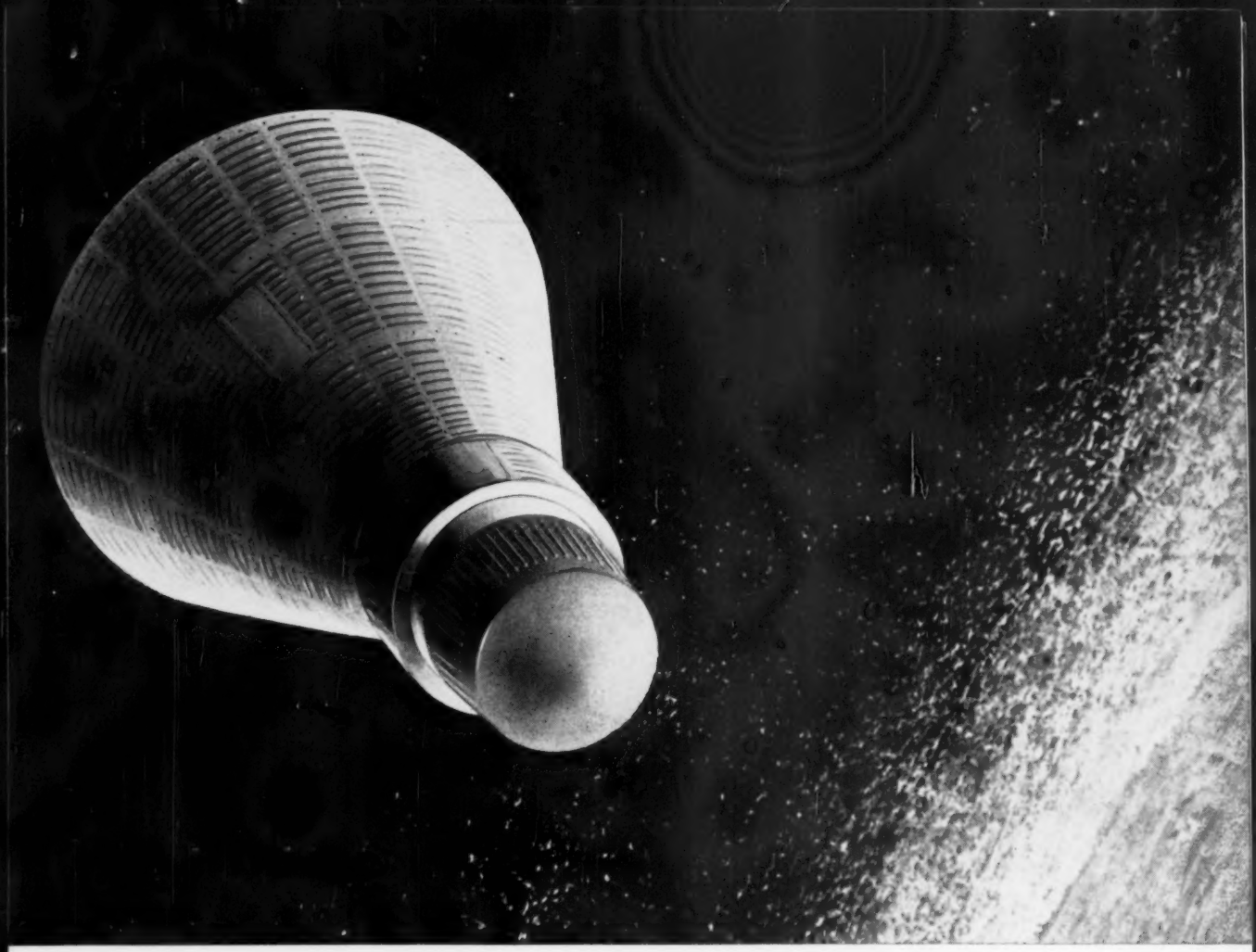
The time: May 5, 1961, 10:34 AM, EDT. *The man:* Commander Alan B. Shepard, Jr., USN, Astronaut. *The event:* launching of the Mercury Capsule with man on a down range step into space. *The metal:* titanium for a combination of strength and lightweight in the vehicle's double wall stringer construction.

A major supplier of commercially pure AMS4901 titanium in the Mercury Project, Republic Steel is the nation's *largest* producer of high-performance metals. Republic is a new source of a complete line of precipitation hardenable stainless steels . . . the only source of continuous rolled stainless sheet up to 60″ wide . . . the largest producer of stainless and alloy steels, and steels for cold extrusion.

To meet the challenge of space, Republic Steel is looking deep into the microstructure of steel . . . pulling facts from the heart of steel . . . aiming at fantastic new steels with tensile strengths even beyond 400,000 psi.

Republic's 3-Dimensional metallurgical teams—composed of mill, field, and laboratory metallurgists—help you select, apply, and process the most economical metals capable of meeting requirements. This is a confidential, obligation-free service. For additional information, contact your Republic representative or mail the coupon on the opposite page.

DESIGN ENGINEERS: Mail the coupon for a copy of Republic's new booklet, *Products For The Design Engineer.* Contains a useful Stainless Steel Selector Chart, and information on Republic High Strength Steels, Titanium, Electrical Steels, Vacuum Arc Melted Steels, and other high performance metals.



VACUUM ARC MELTED METALS . . .

Processed into billets, bars, plates and sheets, strip, or wire, Republic Vacuum Arc Melted Metals are produced in 4,000- to 20,000-pound ingots. The consumable electrode vacuum-melting process improves tensile strength, ductility, fatigue life, and performance at high and low temperatures. Precise control reduces nonmetallic inclusions and harmful gases. Republic helps you select the vacuum-melted metal best suited to requirements: constructional alloy steel, high strength alloy steel, bearing steel, stainless steel, super alloy steel, titanium, or special carbon steel.

REPUBLIC PH STAINLESS STEELS . . .

Republic PH 15-7 MO* for missiles and aircraft offers high ultimate tensile strength with excellent mechanical properties to 1000°F. Republic 17-4 PH* for shafts, gears, pins, and other components requires only a one-hour heat treatment at 900°F to develop its full strength (ultimate tensile strength to 200,000 psi). Republic 17-7 PH* for pressure tanks, bellows, springs, and other applications provides better corrosion resistance than the hardenable grades of chromium stainless. Send for PH Stainless Steel Booklet.

*Licensed under Pat. Nos. 2482096, 2505763 and Trade Mark of Licensor.

REPUBLIC STEEL

REPUBLIC HAS THE FEEL FOR MODERN STEEL

REPUBLIC STEEL CORPORATION
DEPT. IA -2207
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

Please send PRODUCTS FOR THE DESIGN ENGINEER Booklet
I would also like more information on:
☐ Republic Titanium
☐ Vacuum Arc Melted Metals
☐ Republic PH Stainless Steels

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

GIVE
US
A
RING

for immediate aluminum service!

We'll reserve space for you

... by warehousing aluminum stock until the moment you need it. Kaiser Aluminum Distributors offer the efficiencies of trained personnel, special cutting equipment, and modern warehousing methods. You'll save space. Save inventory cost. Give us a ring!

CALL THE KAISER ALUMINUM DISTRIBUTOR NEAREST YOU

for aluminum flat sheet, coil sheet, plate, rod, bar, wire and extrusions:

ARKANSAS CITY, KANSAS
Consolidated Metal Products Inc.
3922
(services Mobile Home Market only)

ATLANTA METROPOLITAN AREA
Chase Brass & Copper Co.
PL 5-5731
Hubbell Metals Inc.
Marietta—427-5551

BATON ROUGE, LOUISIANA
Standard Brass & Mfg. Co.
EL 5-5623

BALTIMORE, MARYLAND
Chase Brass & Copper Co.
PL 2-2565
Hill-Chase Steel Co. of Maryland
PE 2-7300

BEAUMONT, TEXAS
Standard Brass & Mfg. Co.
TE 3-2641

BIRMINGHAM, ALABAMA
U. S. Steel Supply Div.—
United States Steel Corp.
ST 7-9611

BOSTON METROPOLITAN AREA
Chase Brass & Copper Co.
LI 2-0126
Industrial Aluminum Co., Inc.
TW 9-2410
Zurbach Aluminum Co.
MO 6-1400

BUFFALO, NEW YORK
Ernst Iron Works
TX 5-5000

CHARLOTTE, NORTH CAROLINA
Hubbell Metals Inc.
ED 4-5385

CHICAGO METROPOLITAN AREA
Chase Brass & Copper Co.
TU 9-4000
Fullerton Metals Co.
ME 7-2700
Korhumel Steel & Aluminum Co.
AM 2-6700
U. S. Steel Supply Div.—
United States Steel Corp.
MI 6-3211

CINCINNATI, OHIO
Chase Brass & Copper Co.
PA 1-3326
Morrison-Drabner Steel Co.
WA 1-4480

CLEVELAND, OHIO
Chase Brass & Copper Co.
HE 2-2300
Copper & Brass Sales, Inc.
EN 1-6757
Osco Steel Co.
BR 1-2425
U. S. Steel Supply Div.—
United States Steel Corp.
BR 1-5000

DALLAS, TEXAS
Chase Brass & Copper Co.
FL 7-8187
Delta Metals, Inc.
LA 6-7443
Earle M. Jorgensen Co.
RI 1-1761
U. S. Steel Supply Div.—
United States Steel Corp.
WA 3-7356

DAYTON, OHIO
Alloy Steels, Inc.
CR 8-4205

DENVER, COLORADO
ABC Metals Corp.
AC 2-0633
Earle M. Jorgensen Co.
AC 2-4691

DETROIT, MICHIGAN
Alloy Steels, Inc.
TE 4-3890
Chase Brass & Copper Co.
TO 8-2939
Copper & Brass Sales, Inc.
FO 6-6200
Eugene Welding Co., Inc.
EM-4721
(services Mobile Home Market only)
Osco Steel Co.
TR 4-3121

ELKHART, INDIANA
Consolidated Metal Products Inc.
JA 3-2260
(services Mobile Home Market only)

FITZGERALD, GEORGIA
G&L Metal Products Corp.
3586
(services Mobile Home Market only)

FT. WAYNE, INDIANA
Art Iron & Wire Works, Inc.
A-0331

GRAND RAPIDS, MICHIGAN
Copper & Brass Sales, Inc.
EM 1-6681

HIALEAH, FLORIDA
Fullerton Metals Co.
TU 8-8424

HONOLULU, HAWAII
Honolulu Iron Works
50-961
Earle M. Jorgensen Co.
814-281

HOUSTON, TEXAS
Chase Brass & Copper Co.
CA 2-7266
Earle M. Jorgensen Co.
OR 2-1621
Standard Brass & Mfg. Co.
RI 7-1220

INDIANAPOLIS, INDIANA
Chase Brass & Copper Co.
ME 7-1543
Hubbell Metals Inc.
ST 7-1341
F. H. Langsenkamp Co.
ME 6-4321

KANSAS CITY, MISSOURI
Chase Brass & Copper Co.
VI 2-1710
Hubbell Metals Inc.
BA 1-7760

LITTLE ROCK, ARKANSAS
Delta Metals, Inc.
LO 5-5536

LOS ANGELES, CALIFORNIA
Chase Brass & Copper Co.
RA 3-5351
Consolidated Metal Products of Calif., Inc.
658-6158
(services Mobile Home Market only)
Eureka Metals Supply Co.
MA 8-3161
Earle M. Jorgensen Co.
LO 7-1122
Reliance Steel & Aluminum Co.
LU 3-6111
U. S. Steel Supply Div.—
United States Steel Corp.
LU 5-0101

LOUISVILLE, KENTUCKY
Hubbell Metals Inc.
ME 7-2595

MEMPHIS, TENNESSEE
Hubbell Metals Inc.
WH 8-1661

MILWAUKEE, WISCONSIN
Chase Brass & Copper Co.
DI 2-7630
Fullerton Metals Co.
HU 1-6900
Lewis Steel & Aluminum Co., Inc.
EV 4-6000

MINNEAPOLIS-ST. PAUL METROPOLITAN AREA
Chase Brass & Copper Co.
FE 6-4661
Fullerton Metals Co.
ST 1-3456
Korhumel Steel & Aluminum Co.
FE 6-2661
U. S. Steel Supply Div.—
United States Steel Corp.
MI 6-7311

NEW YORK-NEWARK METROPOLITAN AREA
Chase Brass & Copper Co.
TW 4-0500
T. E. Conklin Brass & Copper Co., Inc.
WA 5-7500
A. R. Purdy Co., Inc.
CH 3-4455
David Smith Steel Co., Inc.
GE 9-5600
U. S. Steel Supply Div.—
United States Steel Corp.
BA 7-7711

NEW ORLEANS, LOUISIANA
Chase Brass & Copper Co.
HU 6-5441
Standard Brass & Mfg. Co.
HU 8-1381

OCALA, FLORIDA
Consolidated Metal Products Inc.
MA 9-5059
(services Mobile Home Market only)

OMAHA, NEBRASKA
Gate City Steel Inc.
341-1830

PAWTUCKET, RHODE ISLAND
Tower Iron Works, Inc.
GA 1-8123

PHOENIX, ARIZONA
Earle M. Jorgensen Co.
BR 2-0461
Reliance Steel & Aluminum Co.
AL 8-7145

PORT ARTHUR, TEXAS
Standard Brass & Mfg. Co.
YU 5-9377

PORTLAND, OREGON
Eagle Metals, Inc. of Oregon
AT 8-5201
U. S. Steel Supply Div.—
United States Steel Corp.
CA 2-3283

PHILADELPHIA, PENNSYLVANIA
Chase Brass & Copper Co.
BA 3-5800
Hill-Chase & Co., Inc.
PI 3-5400
U. S. Steel Supply Div.—
United States Steel Corp.
WA 5-7882

PITTSBURGH, PENNSYLVANIA
Wm. M. Orr Co., Inc.
CH 2-3000

PROVIDENCE, RHODE ISLAND
Chase Brass & Copper Co.
DE 1-2300

RICHMOND, VIRGINIA
Hill-Chase Steel Co. of Virginia
359-6031

ROCHESTER, NEW YORK
Chase Brass & Copper Co.
HA 6-3959

SAN ANTONIO, TEXAS
Delta Metals, Inc.
CA 3-4248

SAN FRANCISCO-OAKLAND METROPOLITAN AREA
American Brass & Copper Co.
HI 4-2366
Chase Brass & Copper Co.
PL 6-4809
Earle M. Jorgensen Co.
HI 4-2030
U. S. Steel Supply Div.—
United States Steel Corp.
MA 1-4988

SEATTLE, WASHINGTON
Chase Brass & Copper Co.
MA 4-1862
Eagle Metals Co.
PA 3-9974
Earle M. Jorgensen Co.
MU 2-7910
U. S. Steel Supply Div.—
United States Steel Corp.
MA 3-3014

SHREVEPORT, LOUISIANA
Standard Brass & Mfg. Co.
UN 5-4241

SOUTHINGTON, CONNECTICUT
Zurbach Aluminum Co.
MA 8-5547

SPOKANE, WASHINGTON
Eagle Metals Co.
KE 4-0586

ST. LOUIS, MISSOURI
Chase Brass & Copper Co.
PR 6-3111
Hubbell Metals Inc.
FR 1-0212
U. S. Steel Supply Div.—
United States Steel Corp.
JE 5-0440

TAMPA, FLORIDA
Fullerton Metals Co.
4-6121

TOLEDO, OHIO
Art Iron & Wire Works, Inc.
CH 1-1261

TULSA, OKLAHOMA
Earle M. Jorgensen Co.
TE 5-1511

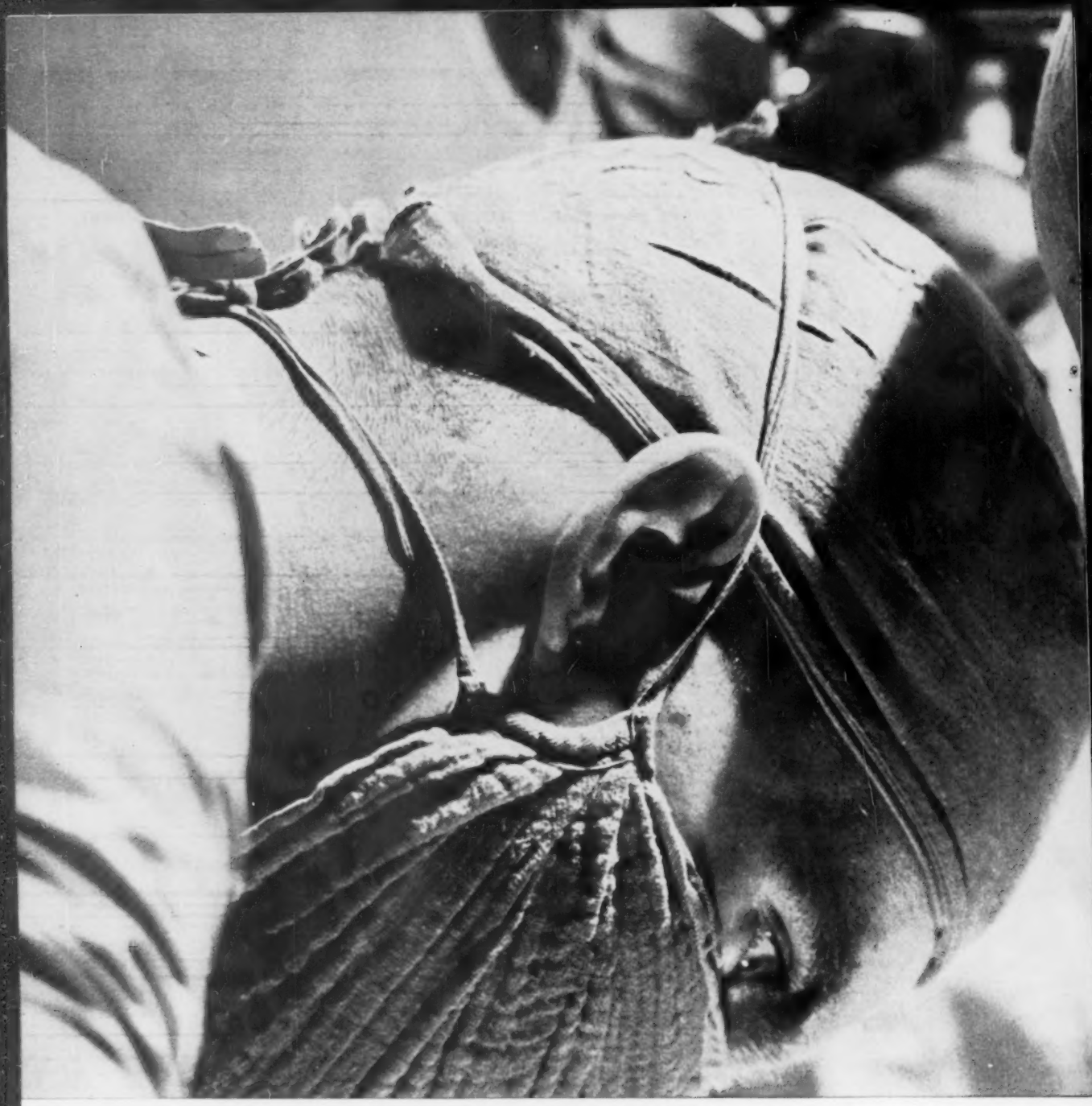
WATERBURY, CONNECTICUT
Chase Brass & Copper Co.
PL 6-9444

WICHITA, KANSAS
Earle M. Jorgensen Co.
LY 1-3425

See HONG KONG and MAVERICK weekly, ABC-TV Network.

KAISER ALUMINUM
★T. M. KAISER ALUMINUM & CHEMICAL CORP.

NEW LEADERSHIP IN THE WORLD OF ALUMINUM



Heart surgery is always a matter of life and death.

The people who perform these operations and the equipment they use must work flawlessly. When they open the heart, it stops supplying blood to the body. So, they use an artificial heart and lung machine that pumps out the blood, keeps it at body temperature, removes carbon dioxide, adds oxygen and then returns it to the patient. This machine must not fail!

The design, construction and materials of the artificial heart and lung machine are the very best man can devise. Pemco, Inc. uses USS National Seamless Steel Tubing (Type 304 Stainless) for pump fittings, blood handling connectors and vessels.

For tubing that can meet the most critical requirements, ask for USS National Seamless Steel Tubing. National Tube Division, U. S. Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and National are registered trademarks

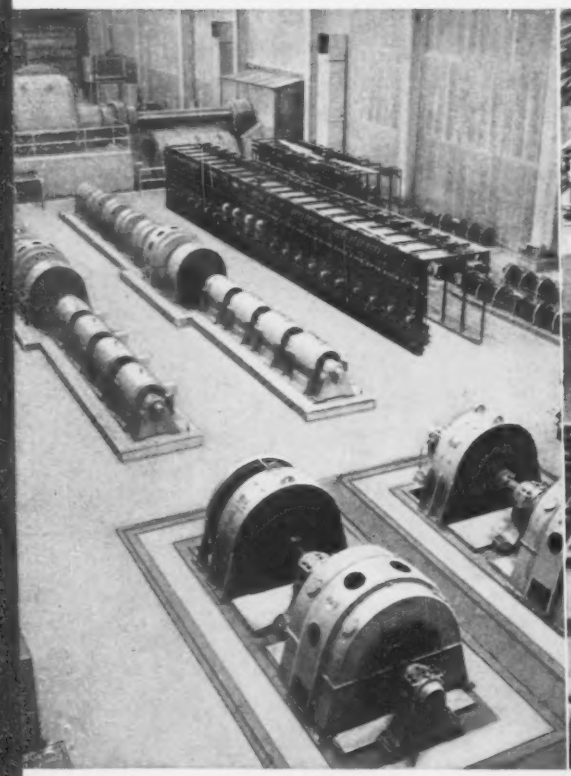
This mark tells you a product is made of modern, dependable Steel.

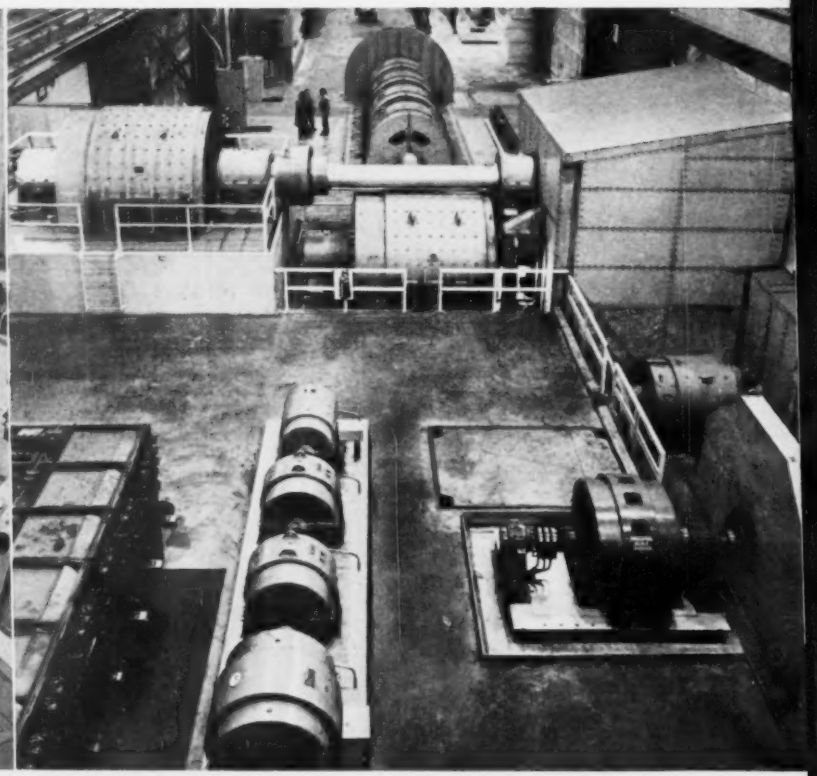
National Tube Division of United States Steel

Columbia-Geneva Steel Division, San Francisco Pacific Coast Distributors
United States Steel Supply Division
United States Steel Export Company, New York

Pick a process...any mill process...and discover the dynamic Allis-Chalmers leadership in

Power for Steel





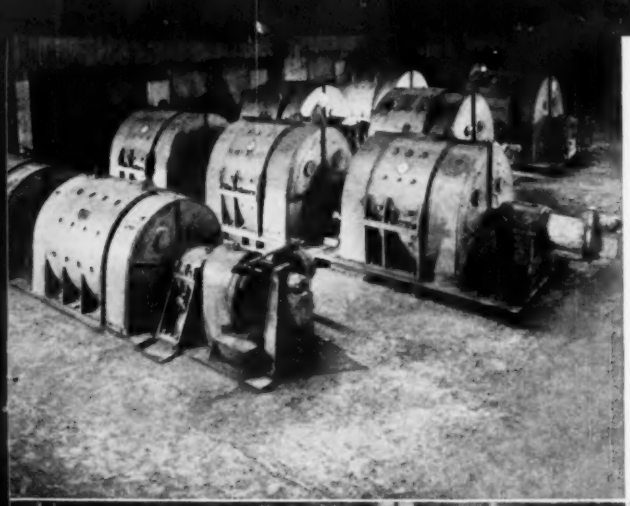
Allis-Chalmers power serves blooming mill: Installed in 1953, the 45-in. by 115-in. blooming mill at Granite City Steel operates as a high-lift slabbing mill. It's powered with an Allis-Chalmers 10,000-hp twin drive, 40/80-rpm reversing motor. Additional A-C equipment includes switchgear, direct-current control, constant and variable-voltage m-g sets, and REGULEX exciter sets.

Hot strip mill upgraded: Granite City Steel's hot strip mill has been continuously upgraded to increase tonnage and quality. A four-stand finishing train, installed in 1936, was upgraded in 1941 with the addition of a fifth finishing stand. In 1952, a three-high rougher was replaced with a four-high reversing rougher — horsepower was increased from 3000 hp to 7000 hp plus a 1000-hp edger. Horsepower of the finishing train was later increased by raising bus voltage from 600 to 650 volts. Now, an Allis-Chalmers feedback automatic gage control is being installed to increase quality of strip.

Throughout the mills at Granite City Steel are numerous examples of Allis-Chalmers leadership and experience in power for steel. A-C equipment is used in virtually all operations—rolling mills, processing lines, sintering plant, and power plant. All demonstrate the extra value that is standard with A-C products, systems and services. Allis-Chalmers can also help you serve tomorrow's changing markets profitably. See your A-C representative or write directly to Allis-Chalmers, Industries Group, Milwaukee 1, Wisconsin.

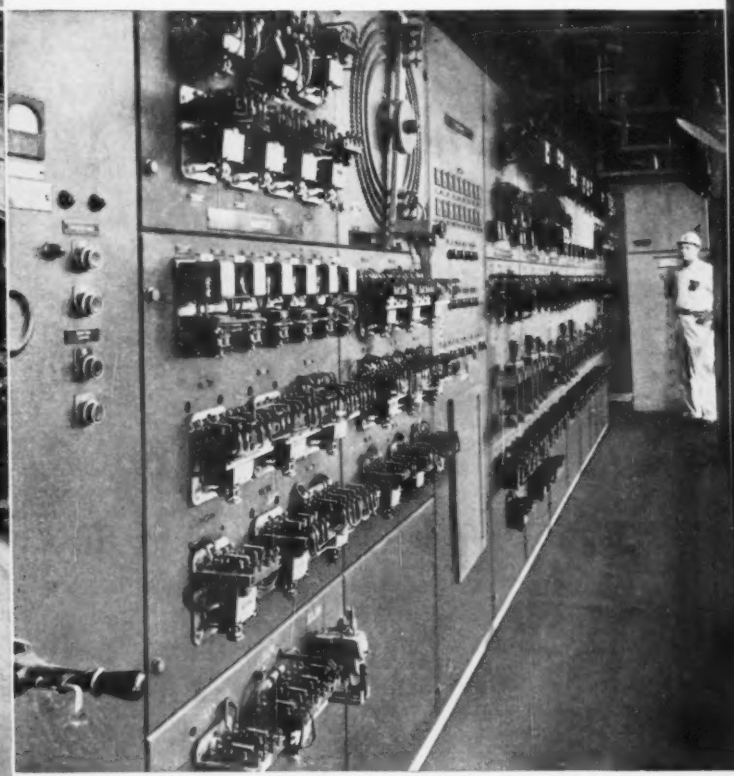
A-1454

Regulex is an Allis-Chalmers trademark.



A-C cooperation limits "changeover" downtime: In 1958, Granite City Steel's four-stand cold strip mill was modernized to increase sheet-gage tonnages by 35%. Downtime for the changeover (from 9600 hp at 2800 fpm to 18,700 hp at 3600 fpm) was three weeks. A-C installed motors, m-g sets and 400-cycle control. Now being constructed are the motors, control, and a feedback automatic gage control for a new 40-in. Sendzimir mill.

Allis-Chalmers powers shearing line: Allis-Chalmers direct-current adjustable-voltage control and direct-current drives provide accurate shearing of sheets at speeds up to 1000 feet per minute. A magnetic piler, incorporated in this line, assures careful handling of sheets.



Sixty-eight motors power plating rolls: When this electrolytic tinning line went into operation in 1960, sixty-eight 5-hp Allis-Chalmers totally enclosed, fan-cooled dc gearmotors powered the plating rolls. Additional Allis-Chalmers motors and supporting motor-generator sets provide power throughout the line. Allis-Chalmers motors and supporting variable-voltage motor-generator sets also serve a high-speed continuous annealing line at Granite City Steel Company.

ALLIS-CHALMERS PRODUCTS FOR THE STEEL INDUSTRY: Allis-Chalmers serves the steel industry with motors, m-g sets, engine-generator sets, controls, rectifiers, switchgear, transformers, circuit breakers, steam turbine generators, condensers, compressors, pumps, materials handling equipment, crushers, grinding mills, kilns and screens.

ALLIS-CHALMERS

Is yours plain or fancy? . . . . part or product?

It's hard to put a label on metal forms like these. That bellows-shaped assembly in the center, for instance, gets cut up into units that become flour sifters.

The point is—your design or specs are the result of careful planning. How they are produced—and who is best qualified to do it—should have the same careful consideration.

As these custom-produced parts show, A.S.C. Divisions have the ability—and agility—to meet complex or simple requirements. Try them.

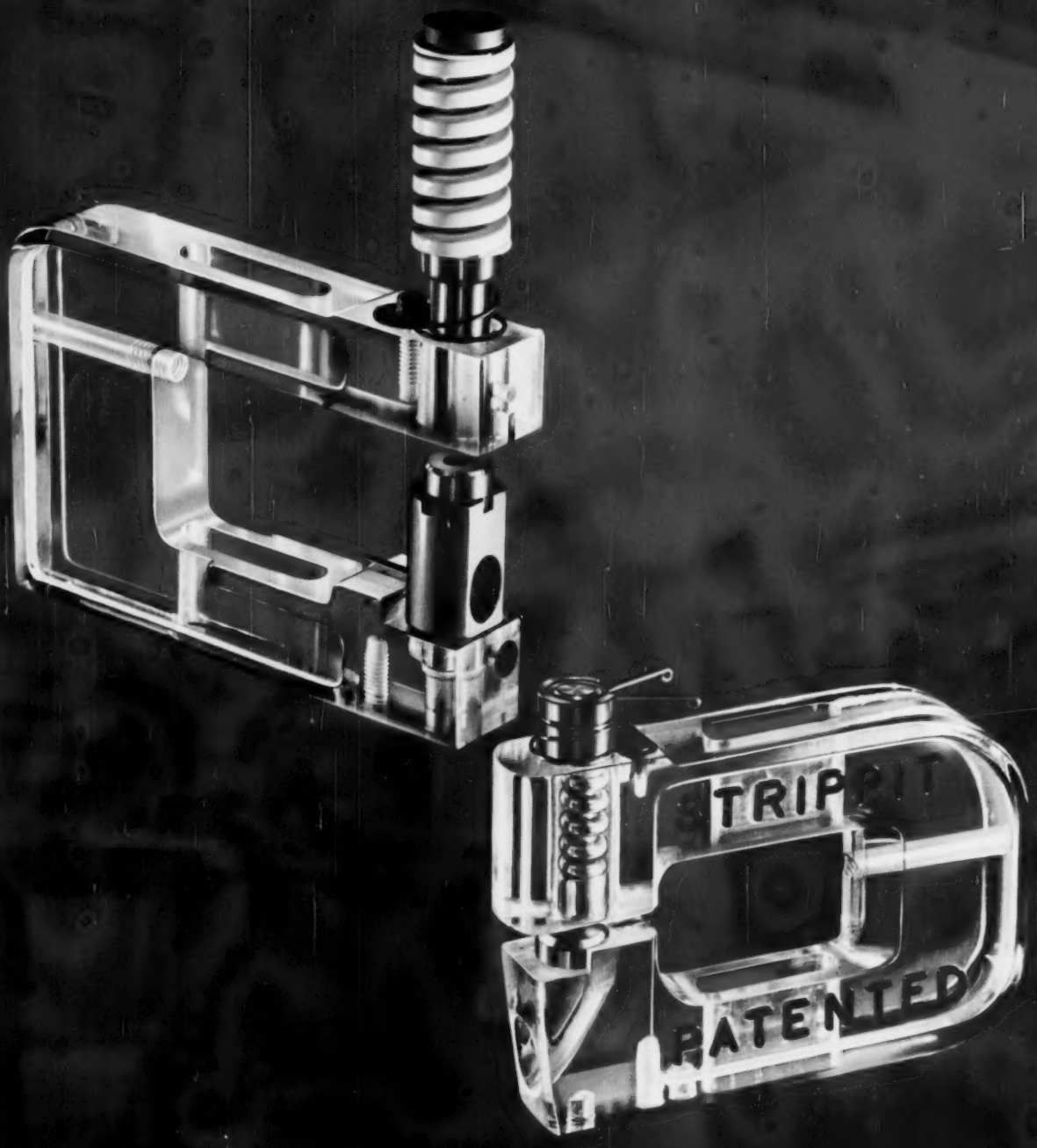
For detailed information about who we are and what we make, write for "Pocket Guide to Springs and Other Things."

8109

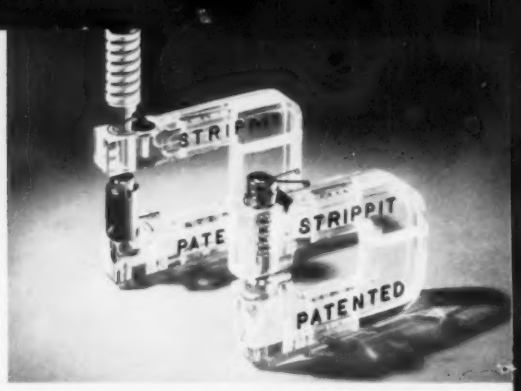
Associated Spring Corporation

General Offices: Bristol, Connecticut

Wallace Barnes Division, Bristol, Conn. and Syracuse, N. Y.
F. N. Manross and Sons Division, Bristol, Conn.
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.
Raymond Manufacturing Division, Corry, Penna.
Ohio Division, Dayton, Ohio
Cleveland Sales Office, Cleveland, Ohio
Chicago Sales Office, Chicago, Ill.
Wallace Barnes Co., Ltd., Hamilton, Ont. and Montreal, Que.
B-G-R Division, Plymouth and Ann Arbor, Mich.
Gibson Division, Mattoon, Ill.
Milwaukee Division, Milwaukee, Wis.
Seaboard Pacific Division, Gardena, Calif.



Get the inside story on cost saving STRIPPIT hole-punching units at the tool show - booth 1305



STRIPPIT bares all at the Tool Show. In addition to these transparent plexiglass holders that show exactly how STRIPPIT "BN" and "CJ" self-contained hole punching units are put together, you'll see actual demonstrations of STRIPPIT machinery in action and a display of all the other cost-cutting STRIPPIT sheet metal hole punching and notching units.

STRIPPIT Super 30 Fabricator punches round and shaped holes in workpieces 60" wide—any length. This amazingly versatile machine will also punch close-centered hole clusters in any material up to ¼" thick . . . notch and nibble square or contour cutouts in ⅛" material. Standard and special tools interchange in seconds. The Super 30 also features an indexed tool holder, micrometric gaging and an adjustable work table.

Stop at booth 1305 for positive proof that STRIPPIT cuts costs

STRIPPIT 15-A Fabricator saves you days or even weeks of time by eliminating tool designing and die-making. A new unique micrometric gaging system enables you to punch complicated patterns of round and shaped holes directly on this machine . . . to exact layout specifications . . . in minutes. The STRIPPIT 15-A also notches and nibbles sheet material.

STRIPPIT Duplicator functions like a pantograph to reproduce any hole pattern from a drilled or punched template. No custom dies are needed to turn out precision sheet metal parts in volume. The STRIPPIT Duplicator is a valuable accessory for both the Super 30 and 15-A Fabricators.

WALES **STRIPPIT** INC. HOUDAILLE INDUSTRIES INC.

Buell Road • Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ont.; In Continental Europe: Raskin, S. A., Lausanne, Switzerland; In the British Isles: E. H. Jones (Machine Tools) Ltd., Hove, Sussex, England.

STRIPPIT Flex-O-Drill drills, reams, center punches and scribes with tool room accuracy . . . ±.002". By eliminating the need for base line drawings and vernier height gages, the Flex-O-Drill can reduce template making time 50%, or more. Want an accurate machine for checking drawings, patterns, templates or production pieces? A new, inexpensive accessory converts the Flex-O-Drill to this dual purpose.

VISIT OUR BOOTH NEW YORK COLISEUM '61 ASTME TOOL EXPOSITION MAY 22-26

Ore importers... save money via Portland (Oregon) Harbor

Terrific savings by faster discharging of ores and ore concentrates await importers . . . on completion of Portland Public Docks' giant new bulk unloader later this year.

Geared for direct transfer from ship to rail or truck, this straight-line bulk unloader has a rated capacity of 900 tons-an-hour.

The facility will be the only one of its kind on the entire Pacific Coast.

PORTLAND PUBLIC DOCKS

operated by the Commission of Public Docks
3070 N. W. Front Ave., Portland 10, Ore. TWX PD309U

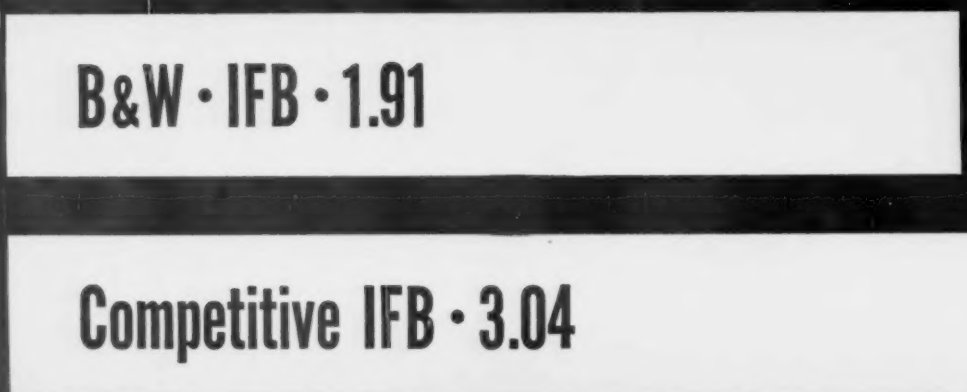
Eastern Representative:
Buckley & Co., 170 Broadway New York 38, N. Y.

ORE IMPORTERS TAKE NOTE!
For detailed information on how Portland Harbor's new bulk unloader can cut your importing costs write: Sales-Traffic Department, Portland Public Docks

Another *plus* of Lightweight B&W Insulating Firebrick

LOWER THERMAL CONDUCTIVITY means

THERMAL CONDUCTIVITY COEFFICIENT*



NOTE: The above chart, based on available published figures, compares the difference in thermal conductivity between lightweight B&W IFB and the average of seven other leading insulating firebrick. This example, specifically covering 2300 F use limit insulating firebrick, is representative of the low conductivity of B&W IFB at all temperature levels.

*BTU/SQ. FT./IN. THICKNESS/HR./DEG. F.

All insulating firebrick are not the same. Published figures show wide variations in *all* of the important properties among the leading brands of IFB.

Take thermal conductivity. This important property affects fuel costs, temperature control and the speed with which a furnace heats and cools. Thermal conductivities range from a B&W low of 1.91 to a high of 3.47 for a competitive IFB—*almost a 100% difference in wasted heat and fuel costs.*

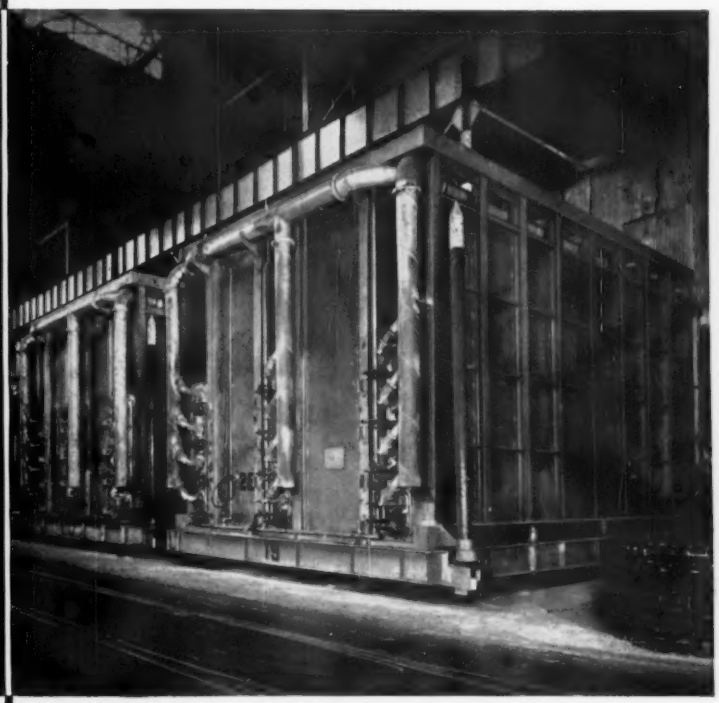
You are paying for insulating firebrick . . . make sure you get *all* the benefits. B&W—the originator of IFB—manufactures a full line of IFB with an experience-proved balance of light weight, high insulating value, high strength and long life.

For complete information on B&W Insulating Firebrick, write for Catalog R-38 to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, N. Y.

ONE OF A SERIES

LOWER FUEL COSTS

the payoff



- **14% lower fuel costs • 30 F lower casing temperature**
- **25% less time to reach operating temperature • 12 hours saved per cycle**

These are the results of a direct comparison of two furnaces of the type shown above, one lined with B&W IFB and the other with one of the better competitive insulating firebrick. That's how B&W pays off for a major steel company in their 8-stack, hood type, strip annealing furnaces. This is just one of many proofs in our files that "there is an important difference in insulating firebrick."

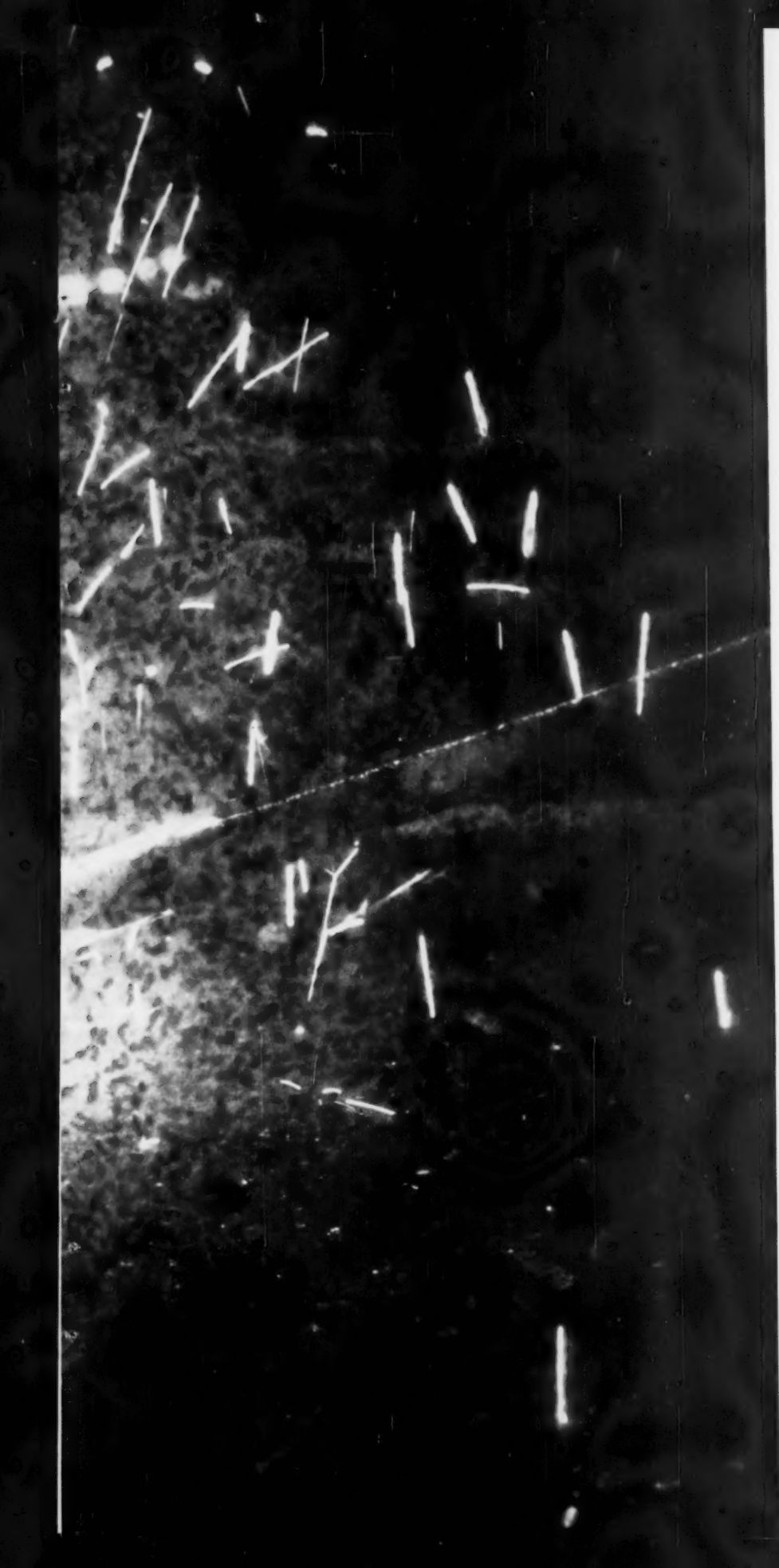
B&W

THE BABCOCK & WILCOX COMPANY

REFRACTORIES DIVISION

R-650

Steel



THE FINER TOUCH

Accuracy. By a steelmaking specialist. Ladle a sample. Test. Check again and again ■ Much may depend on tiny pellets of alloying metal in a furnace of molten steel. The strength of a bridge. The corrosion-resistance of a chemical vessel. Accuracy is essential to the skilled builders of these vital projects ■ And it's a characteristic long associated with Lukens . . . in research, in producing plate steels. Carbon plates by the thousands of tons. Special-duty clad and alloy steels. Armor steels. Heads and steel plate shapes. Accuracy is one of many characteristics that make Lukens—

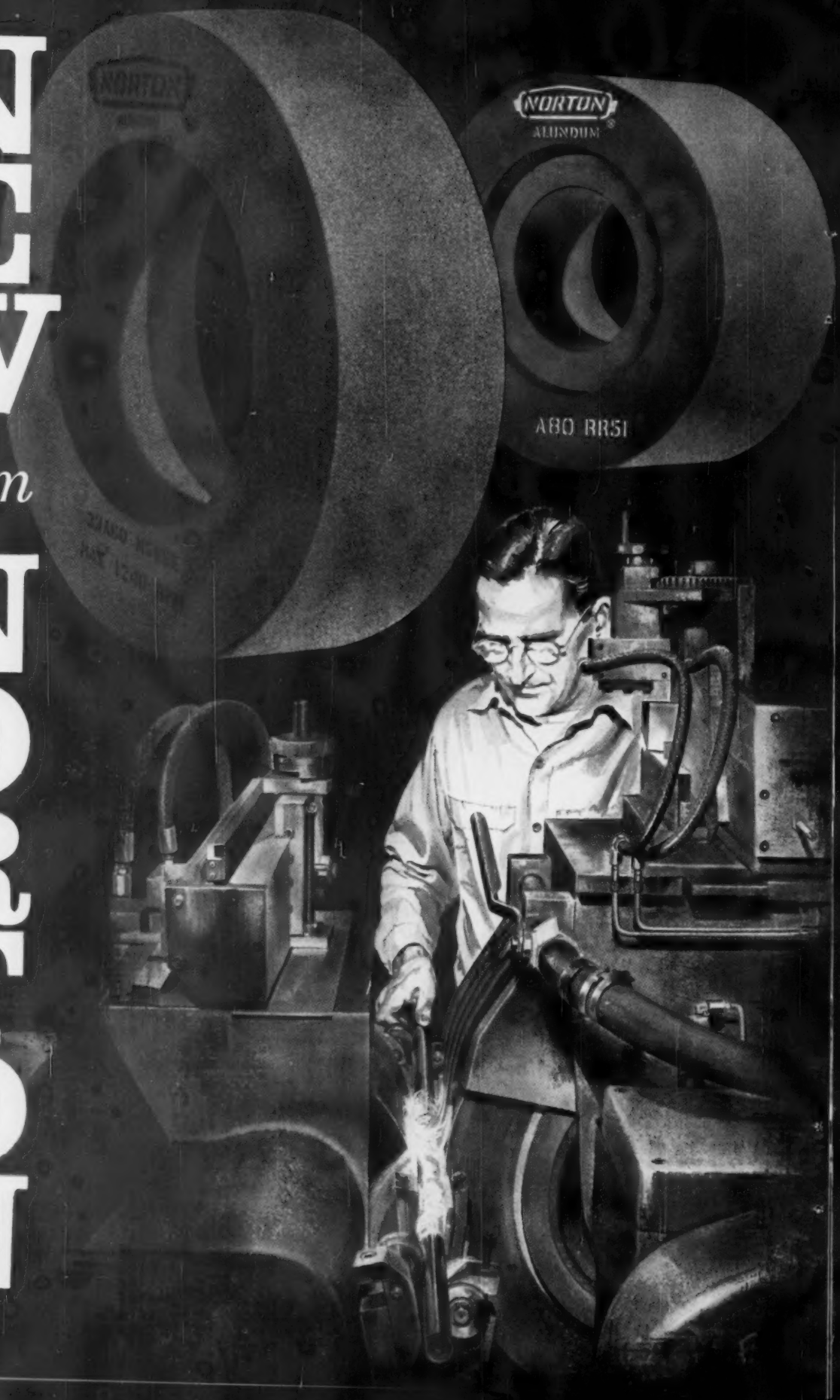
THE SPECIALIST
IN PLATE STEELS

LUKENS STEEL

COATESVILLE, PA.

PHOTOGRAPH BY PAUL WELLER

NEW *from* NORTON



The top-ranking wheel team for centerless grinding

The 23 ALUNDUM grinding wheel and R51 feed wheel . . . the best performing, longest lasting combination on any centerless grinder.*

Although centerless grinding is a two-wheel operation, it doesn't need to be a two-brand buying chore.

HERE'S WHY.

Norton now offers this outstanding wheel team for production-precision and economy in centerless grinding . . .

- *The 23 ALUNDUM grinding wheel for premium performance at non-premium price.*
- *The R51 bond feed wheel for positive feed and accurate work support plus long service life.*

23 ALUNDUM Abrasive is no ordinary aluminum oxide. In price it is *non*-premium . . . but with *premium* toughness and sharpness . . . and fast, free cutting action that means *premium* performance.

23 ALUNDUM wheels have other important advantages: friability, which minimizes dressing . . . uniform duplication, for uniform performance . . . and versatility, for grinding all steels, Meehanite, aluminum and many other metals.

Teammate R51 is not just another feed wheel. This special Norton abrasive-and-bond combination has thoroughly proved the importance of the feed wheel to accurate, low-cost centerless grinding.

Reports from plants all over the country credit R51 wheels with exceptional performance, minimum dressing and no slipping or chatter. And Norton quality control keeps them uniform from wheel to wheel and lot to lot.

On the new Norton No. 2 Straddle-Bearing Centerless Grinder — or on any other machine of this type — 23 ALUNDUM grinding wheels and R51 feed wheels make your best matched team for low cost, volume production centerless grinding. For expert aid in wheel selection, and a test run in your plant, see your Norton Man, a trained Abrasive Specialist, or your Norton Distributor, NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

*Trade Mark Reg. U.S. Pat. Off. and Foreign Countries

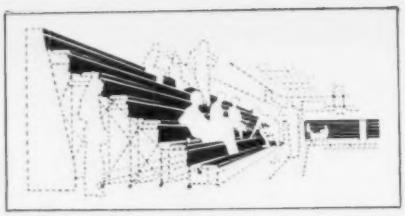
NORTON
ABRASIVES

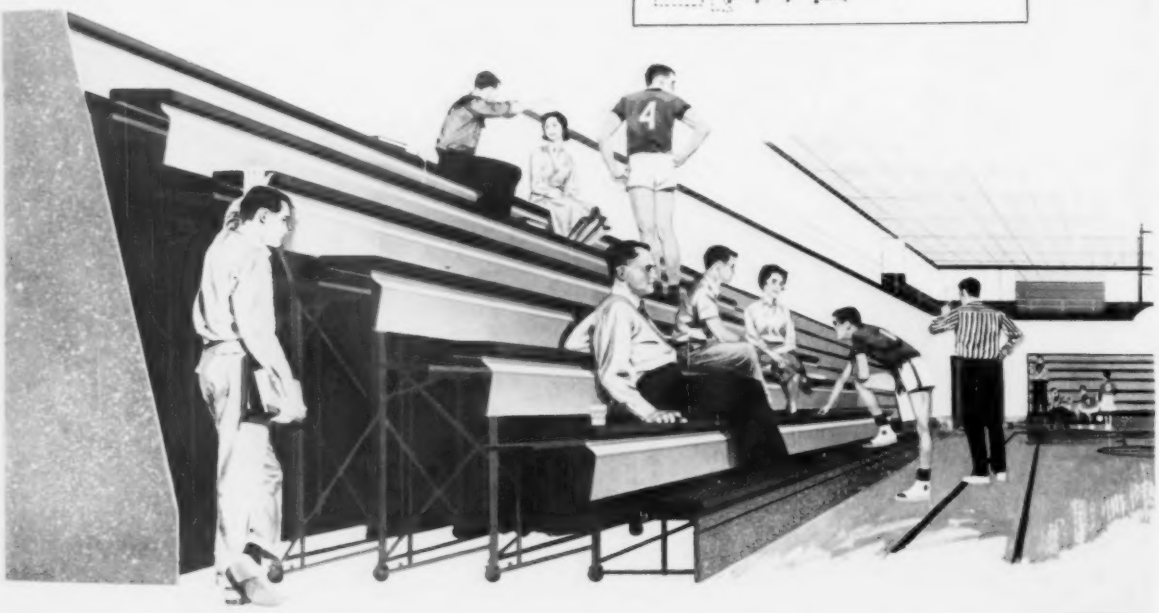
W-2011

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors—BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

FOLDING GYM SEATING MADE WITH CLAD-REX VINYL-CLAD METAL





Clad-Rex vinyl-clad metal can add to the sales appeal and profit of <u>your</u> product, too!

Brunswick, a leader in commercial and institutional furniture, has a new line of folding seating for school gymnasiums. Obviously, tough competition, styling and rugged durability were a factor in their design. Clad-Rex vinyl-clad metals are used for both seat and drop-skirt areas. Fabrication, according to Brunswick, is much the same as with bare sheet metal—except for finishing, which is not needed!

See how Clad-Rex vinyl-clad metals can help your product by contacting Simoniz Industrial Products, 11506 West King Street, Franklin Park, Illinois (Phone Gladstone 1-2323). Ask for Report 6101, "How to Use Vinyl-Clad Metal in Commercial Furniture".

Clad-Rex Vinyl-Clad Metal is a product of

RESEARCH • DEVELOPMENT • ENGINEERING

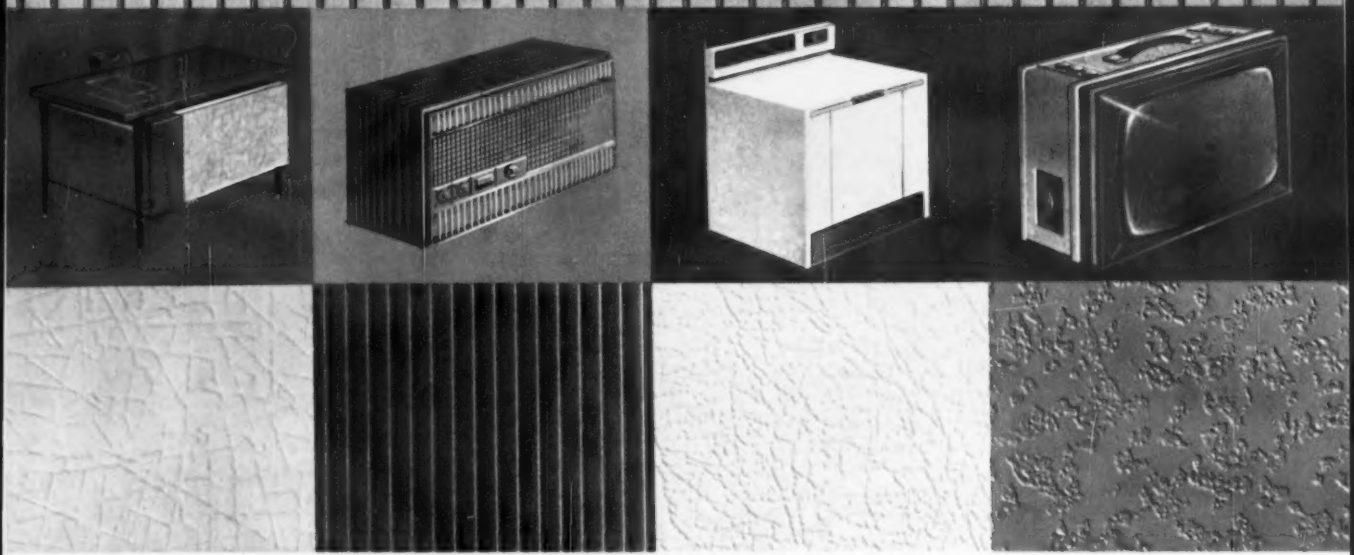
28B

SIMONIZ INDUSTRIAL PRODUCTS

A Division of Simoniz Company

CLAD-REX VINYL-CLAD METALS • **SIMONAIRE** FOAMS AND INDUSTRIAL CHEMICALS
SIMONIZ RESEARCH, DEVELOPMENT AND ENGINEERING

PICK A PATTERN FOR YOUR PRODUCT FROM PITTSBURGH STEEL SHEET



Wrapper stock or drawn parts, flat panels or roll-formed fittings—whatever the application, Wide Pattern Designed Sheet gives finished products snap and sparkle that attract buyers, boost sales. Patterned Sheet—as wide as 60 inches, thicknesses from .0179 to .0897 inch—is available in commercial, drawing and AK drawing quality steel; has same fabricating properties as plain cold-rolled sheet in your processing equipment. Rolled-in designs—unlimited in range—take paint, enamel, porcelain, plated finishes. Investigate Wide Pattern Designed Sheet—steel with decorative appeal, from . . . PITTSBURGH STEEL COMPANY, Pittsburgh, Pa.

for other steel specialties turn page.

HOW "BOSTON" PROFITS FROM THOMAS NICKEL-COATED STRIP

Thomas Strip buffed nickel-coated steel strip reflects 40% saving, fewer production steps for C. Howard Hunt Pen Co.'s pace-setting "Boston" pencil sharpeners.

At Statesville, N.C., Hunt Pen blanks, embosses, pierces, spot-welds wrapper stock for sharpener cases from coils of 2 by .010-in. buffed nickel-coated steel. Firm has depended on Thomas Strip Division of Pittsburgh Steel Co. 20 years for brilliant finish. Purchasing Agent T. V. McCurdy tells why:

"We once used stainless for wrapper stock but costs skyrocketed. Thomas Strip costs 40% less, gives us handsome appearance, durability and easy fabrication of steel. It eliminates expense and headaches of plating, too.

"We're more critical of this material than any other—the slightest scratch stands out. We've never had to reject any during our long relationship with Thomas."

Hunt Pen produces more pencil sharpeners with nickel-plated strip than any other U.S. manufacturer. Assembly of "Champion" portable model is shown above.

Want to learn how Thomas Pre-Coated Strip Steel Specialties can help you? Ask, and we'll show you.

"WE GET BETTER PRODUCTS FOR LESS WITH THOMAS PRE-PAINTED STRIP," SAYS NATIONAL GYPSUM COMPANY

Tough, durable vinyl-enamel coat on Thomas Pre-Painted Strip fabricates easily as plain steel, gives a profitable boost to "Gold Bond" quality of National Gypsum Company's metal building products.

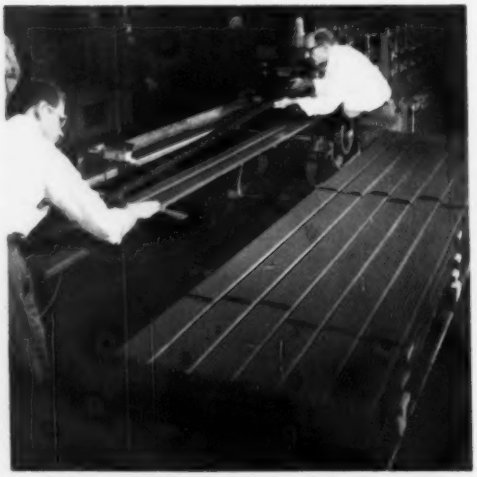
Exposed pre-finished partition bases, cornice moldings, wall trim and "J" suspension channels are roll-formed by National Gypsum Company's Niles, O., Metal Building Products plant. Coiled strip sizes range from 18 to 24 gage in widths $2^{17}/_{32}$ to $4^{1}/_{2}$-in., painted one side with white, grey or red, and wash-coated opposite side.

"Thomas Strip Pre-Painted gives us products far superior to those we got when we spray-painted after forming. It saves us 8.75 to 9.2% of production cost and reduces inventory problems," says Plant Manager D. K. Archer.

"The paint coat has better adhesion and takes roll forming without cracking or peeling. Thomas supplies us superior material of uniform, consistent quality that suits our requirements."

Photo below: roll forming 10-ft. Snap-On bases.

Eliminate your paint-line problems with Thomas Pre-Painted Strip. Let us show you how.



PITTSBURGH STEEL COMPANY

SQUEAKS, RATTLES SILENCED WITH THOMAS PLASTIC-COATED STRIP

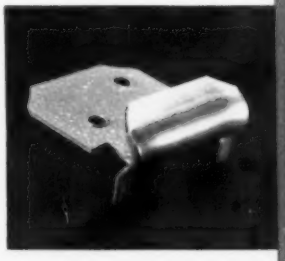
Primary use of Thomas Plastic-Coated Steel is in decorative applications. But it performs a unique practical task for manufacturers of fine furniture.

Laminated to Thomas cold-rolled strip, the plastic coating assures absolutely noiseless functioning of modern, strong steel springing.

Universal Wire Spring Division of Hoover Ball & Bearing Co., Georgetown, Ky., uses Thomas Plastic-Coated Strip to make spring retainer clips that anchor its sinuous wire Uni-Torq and Uni-Flex springs to furniture frames.

"We tried applying pressure-sensitive tape to steel for this clip, but decided on Thomas Plastic-Coated. It's pre-finished and doesn't slip or peel in forming or in use," says Bernie J. Johnson, sales vice president, upholstery spring division.

"The clip acts as a pivot as well as an anchor for our engineered seating springs. Steel against steel produces squeaks and rattles. The plastic coating eliminates them—and makes an important sales point."



Decorative or functional —whatever the need, Thomas Steel Specialties will make your product better, too.

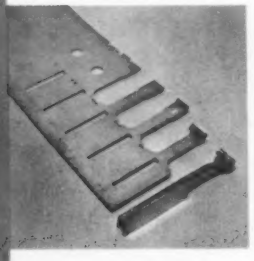
THOMAS STRIP HELPS "BUILD A BETTER MOUSETRAP"

World's biggest trapmaker, Animal Trap Co. of America, has the long-sought "better mousetrap." And Thomas Strip Copper-Coated Steel helps make it so. Rattraps, too.

Animal Trap Co. of America, Lititz, Pa., has depended on Thomas Strip over 25 years for close tolerance copper-coated steel strip to make bait pedals, locking bars for a dozen models.

The firm produces millions yearly from Thomas electroplated stock in sizes from .4375 by .025-in. to 5 by .035-in., #2 temper. Precise tolerances, consistent temper of base steel allow long, trouble-free runs through progressive dies, automated assembly lines.

"Base steel gives strength, economy—the planished copper finish provides appearance and corrosion resistance needed to out-sell cheap foreign-made traps," says Sales Vice President D. S. Morrison.



Want the world to beat a path to your product's door? Thomas Strip plain or coated steel specialties may be what you need. Ask.

PITTSBURGH STEEL COMPANY

BRASS-COATED THOMAS STRIP SAVES FOLDING-RULE MAKER 60% IN METAL COST

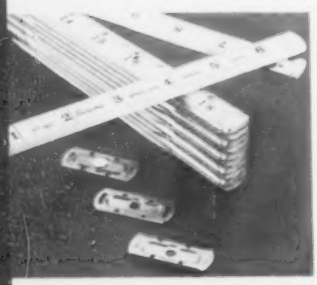
Thomas Strip Brass-Coated steel measures up to strict cost, tolerance, strength and appearance standards for Evans Rule Co. of Elizabeth, N.J., leading producer of measuring rules and tapes.

An improved type of wood folding rule—assembled with 11 patented spring joints, fabricated from Thomas electro brass-coated strip—is produced for Evans by a subsidiary—Fabrule Co.—in a fully automated plant.

For rule joints, Evans buys two sizes of Thomas brass-coated strip—1.812 and 1.562 in. wide by .012-in. thick, #3 temper, planished and oiled.

"Brass-coated strip saves us about 60% over what we'd pay for pure brass for rule joints," says John J. Evans, board chairman.

"Besides that, the base steel supplies strength to take abuse, as well as rigidity needed when the rule is opened. The brass coat provides protection against corrosion and the planished finish results in a sales boosting appearance. Physically, width and temper uniformity is critical for processing through our automated lines."



Do expensive metals hike your product cost? Inquire how Thomas Strip pre-coated steel can help you save.

The STEELMARK on a product tells you it is made of steel. Look for it when you buy.

Steel

NEW—BRUSH PATTERN DESIGN FOR THOMAS PRE-COATED STEEL

Here's a **brand new** addition to Thomas Strip Division's wide range of pre-coated and pattern designed finishes for decorative applications.

Called "Brush Pattern Design," this new Thomas Strip specialty reduces finishing costs, enhances sales appeal through its deep, lustrous, textured and buffed surface—offers products attractive "plus" that influences buying decision, moves items off the shelf.

"Brush Pattern Design" is cold-rolled strip electroplated with copper, brass, nickel or zinc coating, buffed to soft highlighted finish, protected by clear lacquer.

New Thomas Strip technique produces Brush Pattern Design Strip with uniform, nontarnishing plated coating across entire surface. Fabricates easily, without distortion of pattern finish.

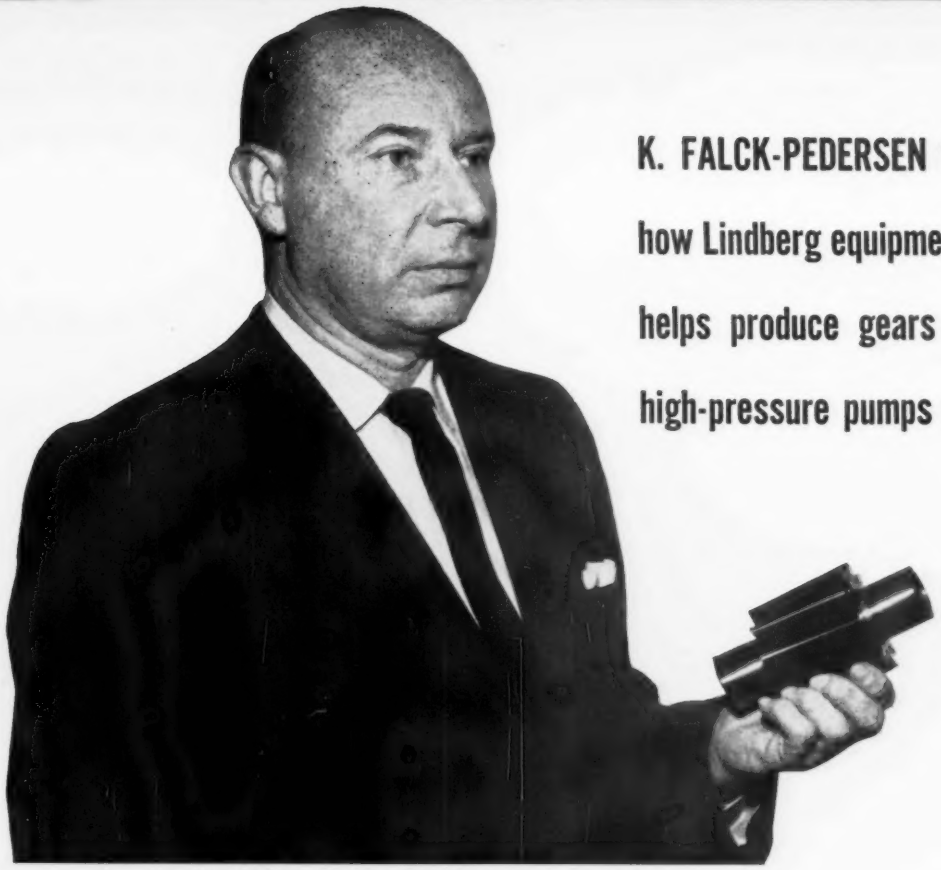
Reduce your product's finishing costs, improve its appearance with Thomas Brush Pattern Design. Thomas experience, design help is yours for the asking. Call or write.

THOMAS STRIP DIVISION
PITTSBURGH STEEL COMPANY
Grant Building · Pittsburgh 30, Pennsylvania

DISTRICT SALES OFFICES

Atlanta	Chicago	Detroit	Philadelphia
	Cleveland	Houston	Pittsburgh
	Dallas	Los Angeles	Tulsa
	Dayton	New York	Warren, Ohio

K. FALCK-PEDERSEN tells how Lindberg equipment helps produce gears for high-pressure pumps



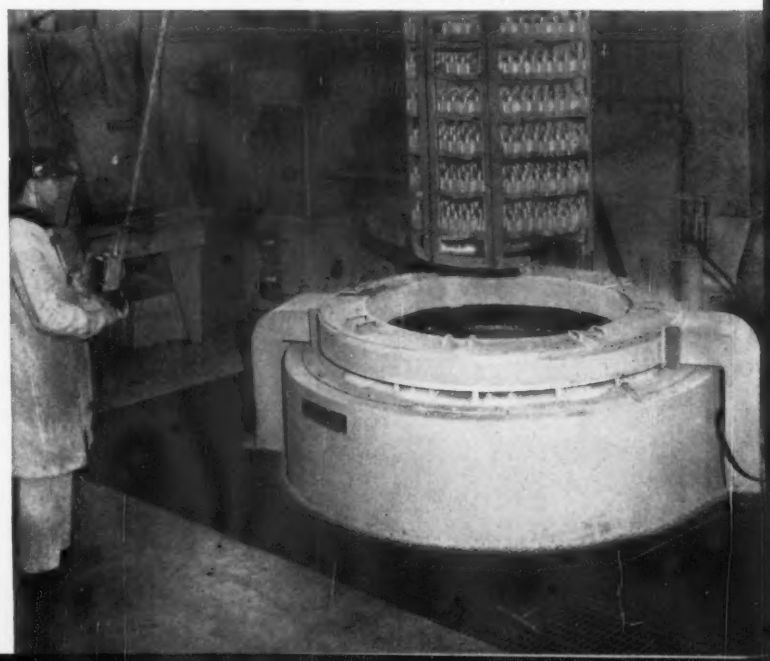
QUOTE

Mr. K. Falck-Pedersen, Chief Engineer, Commercial Shearing and Stamping Company, Youngstown, Ohio.

"The Lindberg heat-treating furnaces and atmosphere generating equipment installed in our Youngstown plant two and one-half years ago provided a fine solution to a big problem of ours. The units now give us complete and precise control over hardening and treating of gears for our high-pressure pumps. During these years, the equipment has proven trouble-free, required little maintenance and has proved to be remarkably easy to operate."

COMMERCIAL shearing & stamping

Gears being loaded in Lindberg Furnace at Commercial Shearing and Stamping Company, Youngstown, Ohio.

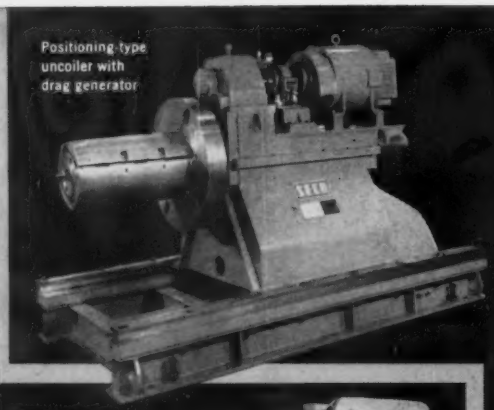


Lindberg equipment at Commercial is used for carburizing gears for high-pressure pumps and allows mass production of practically distortion-free gears, while holding the degree of hardness as well as depth of case to very close tolerances—load after load after load. The installation includes one electric and two gas-fired furnaces, Lindberg Hyen Atmosphere Generator and Carbotrol.

If you have a problem in heat treating, why not get the Lindberg representative's help now? You can depend on his experience and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. And it's easy, too! Just call your Lindberg Field Engineer (he's listed in your classified phone book) or write us direct. Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, Spain, Switzerland and West Germany.

LINDBERG
heat for industry



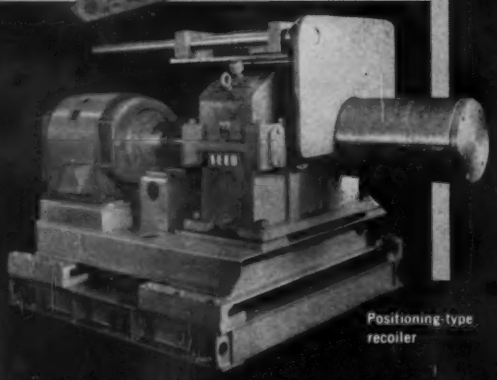
Positioning-type uncoiler with drag generator

Predictable Performance

for processing lines with

SECO

terminal equipment



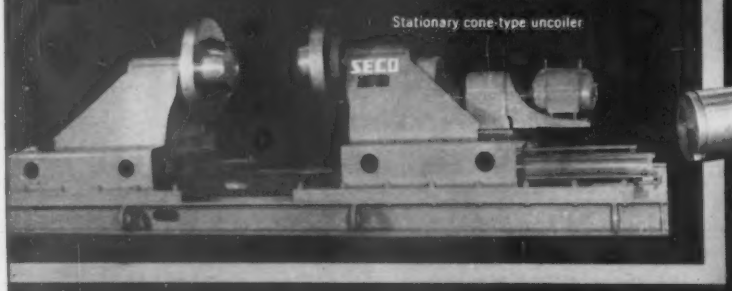
Positioning-type recoiler

From entry to exit, new and modernized processing lines . . . annealing, pickling and others . . . perform better with SECO terminal equipment. This equipment handles coils ranging from 10,000 to 50,000 pounds with speed, convenience, safety.

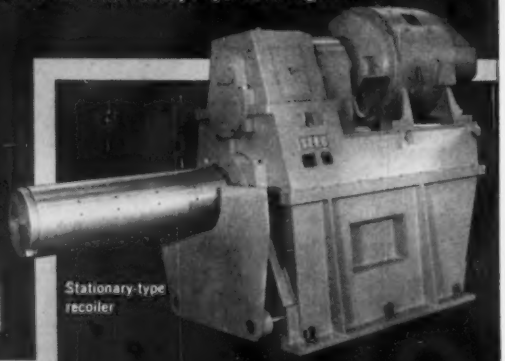
SECO uncoilers and recoilers are designed to operate at any speed the mill requires, are available in positioning or stationary types. The positioning types feature a slideable reel base mounted on a sub-base for alignment with the processing line, actuated by an automatic edge control.

SECO also makes auxiliary equipment such as coil cars with coil lifts to simplify uncoiler loading and recoiler unloading. Available for mandrel or cone-type reels.

A staff of trained sales engineers will assist you in finding the equipment best suited to your needs. Call or write today. West Coast representative: United Machine Tool Company, Los Angeles.



Stationary cone-type uncoiler



Stationary-type recoiler

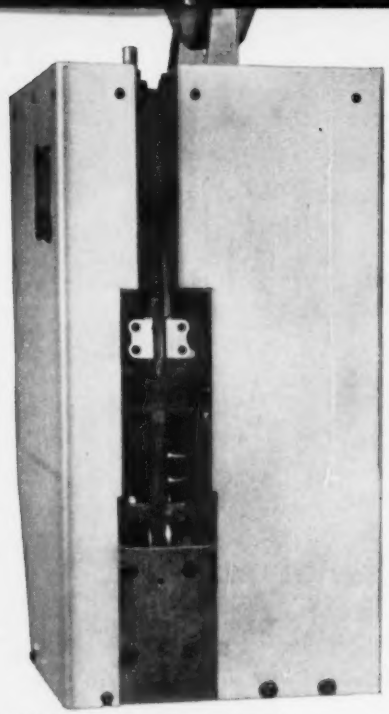
SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Slitting Lines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

STEEL EQUIPMENT COMPANY

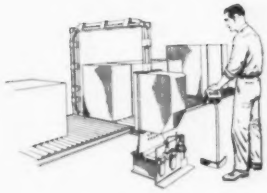
P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

Affiliated with Lee Wilson Engineering Co., Inc.

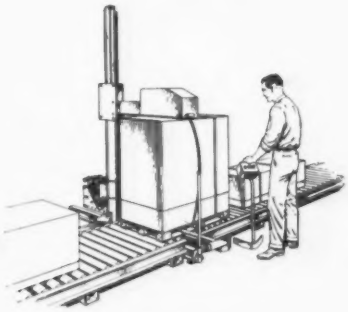


Now, Acme Steel brings you (*literally!*) the world's first strapping machine with

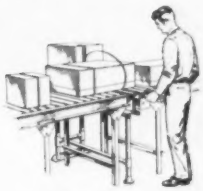
FULL-SIZE PERFORMANCE ...PINT SIZE PRICE



THREE OF MANY



WAYS THE F7



CAN BE USED

THE REVOLUTIONARY **F7** ...so *compact*, we can carry it right into your plant . . . so *complete*, it does everything you want a powered strapping machine for: fast feeding, tensioning, sealing and cutting. And so *conservative in cost!*

The new F7 is not a stripped down facsimile of a larger machine. Its surprisingly low initial cost and operating economy are engineered into the strapping mechanism—a 75 pound, self-contained unit that doesn't rely on complex (and costly to service) electronic circuits. You can adapt it for any regular duty strapping job, equip it for the exact degree of automation you desire (at right are a few of many actual applications).

Now, even modest volume operations can discard outmoded methods. Big users can set up additional strapping lines at a fraction of their former cost. And everyone can give production bottlenecks the slip—the low-cost F7 strapping mechanism can be replaced with a standby in a few minutes!

Call your Acme Idea Man for a quick *carry-in* demonstration. See how the new F7 can handle your packaging operation at a greater profit. Or, return the coupon for full facts.

ACME STEEL **IDEA LEADER IN STRAPPING**

ACME STEEL COMPANY
Dept. IFS-51, 135th St. & Perry Ave., Chicago 27, Ill.

☐ I would like an F7 demonstration in my plant.
☐ Send complete information on the new F7.

NAME_____

TITLE_____

FIRM_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Allis-Chalmers combines fend off corrosion . . .

GUARDED BY GALVANIZED STEEL

When you see a big Allis-Chalmers combine like this cutting grain on the farmlands of America you can be sure that galvanized steel has been used in its construction.

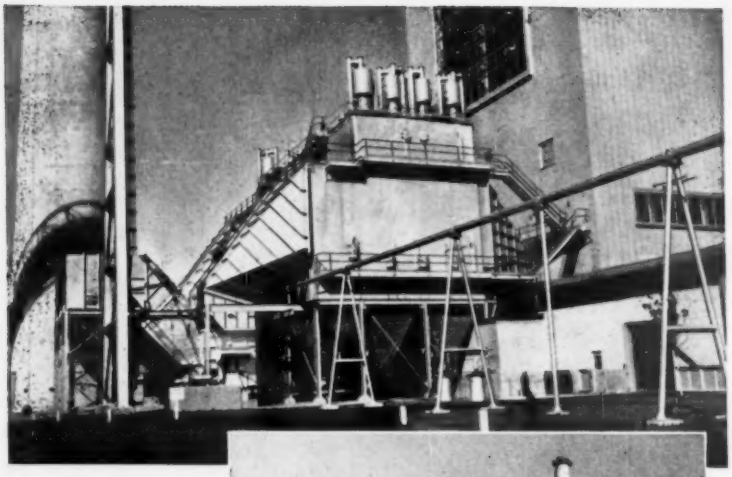
Reasons? First, galvanized steel provides excellent weather protection and low maintenance cost. Neither dew nor drizzle nor drenching rain will find a chink in its zinc coating. That holds true regardless of the severity of the fabricating steps to which it may be subjected. And in addition to its corrosion resistance, galvanized steel has a lot of resistance to high cost: It's easy and economical to fabricate, construct and maintain.

WEIRKOTE® IN PARTICULAR! The galvanized steel used in these combines is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Weirkote can be worked to the very limits of the steel base without chipping or peeling. And it assures you of long-lasting protection against corrosion. It is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION



Research-Cottrell precipitator at a 150,000 KW generating station cleans over half a million cubic feet of gas per minute with 99% collection efficiency.

Con Edison's 350,000 KW generating station at Arthur Kill, Staten Island, has Research-Cottrell precipitators guaranteed to collect 99% of the fly ash from 1,400,000 cubic feet per minute of combustion gases.

Why These Plants Specify 99% Collection Efficiency

Industry's concerted efforts to solve the *air pollution* problem has resulted in an increased demand for 99% collection efficiency guarantees. Only through a continuing program of product improvement has Research-Cottrell made these 99% guarantees economically feasible. Efficient voltage application; specific control of electrical sections; opzel collecting plates; automatically controlled, fully adjustable electrode rapping for optimum operation; accurate internal baffling; proper gas flow patterns through three-dimensional model studies—these are a few of the reasons why Research-Cottrell has been able to increase collection efficiencies without increasing the size of the precipitator.

Research-Cottrell Extra Premium Experience and Know-How

Past performance and reliability are the two major barometers of experience and know-how.

These are the factors which have inspired confidence in Research-Cottrell products as exemplified in the most recent independent central station surveys made by Power and Electrical World magazines.

1960 SURVEYS of Typical Power Stations by both POWER and ELECTRICAL WORLD Magazines

	Research-Cottrell Equipment	
	Power	Electrical World
Percentage of Total Installations In Survey	36%	39%
Percentage of Total Precipitators In Survey	39%	35%
Percentage of Total Gas Cleaning Capacity In Survey	45%	42%

These surveys covered 47 modern central stations including over 75 electrostatic precipitators for air pollution control. In each survey, there were more Research-Cottrell installations reported than for any other of the half dozen manufacturers in the field.

Make sure you receive the "extra premium" which goes with every Research-Cottrell product—experience and know-how.

Research-Cottrell Personnel are capable of handling any problem in the field of gas cleaning and will gladly assist you with your application.

For more information on Research-Cottrell's program of product improvement, contact our local representative or write to the home office.

Research-Cottrell

RESEARCH-COTTRELL, INC. Main Office and Plant: Bound Brook, New Jersey

Representatives in principal cities of U. S. and Canada.

RC225

CF&I Shaped Coils and Stem-Paks® are Packaged for Your Production

SHAPED COILS

Here's a quote from one satisfied user, the president of a wire fabricating plant:

> "A CF&I salesman examined our operation and suggested that we use CF&I Shaped Coils as opposed to the small coils we had previously used. We now stop our machine only once to start a new coil, instead of 10 times a day. We save nearly 2 hours, and have increased our production by about 20%."

CF&I-Wickwire Shaped Coils contain between 1500 and 2500 lbs. of top quality wire in one continuous length . . . are bundled with four steel straps and, when necessary, wooden supports to insure that the coil is not distorted.

OPERATING ADVANTAGES: Increased production, reduced material-handling costs, less wire scrap and less storage space needed.

DISPOSABLE STEM-PAKS

The experience of a typical user:

> "Up to 75% of our production downtime was caused by using too many small coils. Stem-Paks hold 500 to 1000 pounds of continuous wire. These larger packages keep each machine running as much as 1½ hours longer per day. Stem-Paks allow for free unwinding, without snarling. CF&I Stem-Paks have increased our production 50%."

Stem-Paks hold 500-1000 lbs. of wire in one continuous

length . . . consist of a center core attached to a wooden base mounted on 4″ runners.

AVAILABLE IN: Sizes for 14″, 17″ and 21″ center core (inside diameter).

OPERATING ADVANTAGES: Ease of handling, reduced scrap losses, increased production and less storage space.

Only CF&I offers a total of ten different wire packages. You've just read how two of these packages have increased the production efficiency of leading manufacturers. One or more CF&I-Wickwire Wire packages can do the same for you. Our engineering staff will be happy to study your operation and recommend the type that best meets your requirements. For complete details, write your local CF&I sales office.

THE COLORADO FUEL AND IRON CORPORATION
Denver • Oakland • New York
Sales Offices in Key Cities 8114

NEW NOW ENGINEERED

ERICKSON INSERTED BLADE

EQUALS DRILLING ACTION OF TWIST DRILL

SPADE DRILLS

MORE RANGE AT MUCH LOWER COST THAN TWIST DRILLS

FULLY ENGINEERED BLADE GRIND...

Increased cross section at the cutting edge provides Greater Thermal Efficiency—Longer Tool Life than competitive blades.

FREER CUTTING ACTION

Exclusive Erickson method of grinding cutting angles gives Freer Cutting Action since end pressures are reduced.

"Heeling" eliminated.

EASY-TO-USE GRINDING FIXTURE...

Restores Original Factory Grind eliminating biggest obstacle to use of Spade Drills.

All cutting angles maintained during successive regrinds to original factory grind.

SPADE DRILL HOLDERS CORRECTLY ENGINEERED

"Funnel Effect" provided in flute design to speed chip escape.

Scientific distribution of coolant over whole cutting edge.

A-8124A

Send Your Drilling Problems to

ERICKSON TOOL COMPANY

34358 SOLON ROAD • SOLON, OHIO

COLLET CHUCKS • EXPANDING MANDRELS • AIR-OPERATED CHUCKS • FLOATING HOLDERS • TAP CHUCKS
• AUTOMATIC INDEXING • MASTER SPACERS • DIAPHRAGM CHUCKS • PUSH-ON ARBORS • QUICK-CHANGE HOLDERS
• EXPANDING COLLETS • END-CLAMPING CHUCKS • AIR CYLINDERS (allowing stock to pass through)
• EXPANDING JAW MANDRELS • SPECIAL HOLDING FIXTURES (including gear-holding)
• BORING BARS • SPADE DRILLS • RECESSING TOOLS

HENDRICK ORNAMETAL...

lightweight metal designed for design engineers

You're a designer looking for a new material or method to make last year's product look brand new. Chances are you've been through this over and over again. You're really stumped . . . what can you do this time? Maybe Hendrick can help out. Often the inclusion of Hendrick perforated metal in a product's design not only helps increase its overall attractiveness but adds to its saleability as well!

Perforated metal, masonite, rubber, plastic and insulated board can be used in the fabrication of automobiles, furniture, buildings, appliances, notions, novelties, toys, machines and many other products. Hendrick has hundreds of attractive designs to choose from in commercially rolled metals and gauges to suit your exact needs. For more information on how Hendrick can help you out of a design slump, mail the attached coupon today.

HENDRICK Manufacturing Co.
Carbondale, Penna.

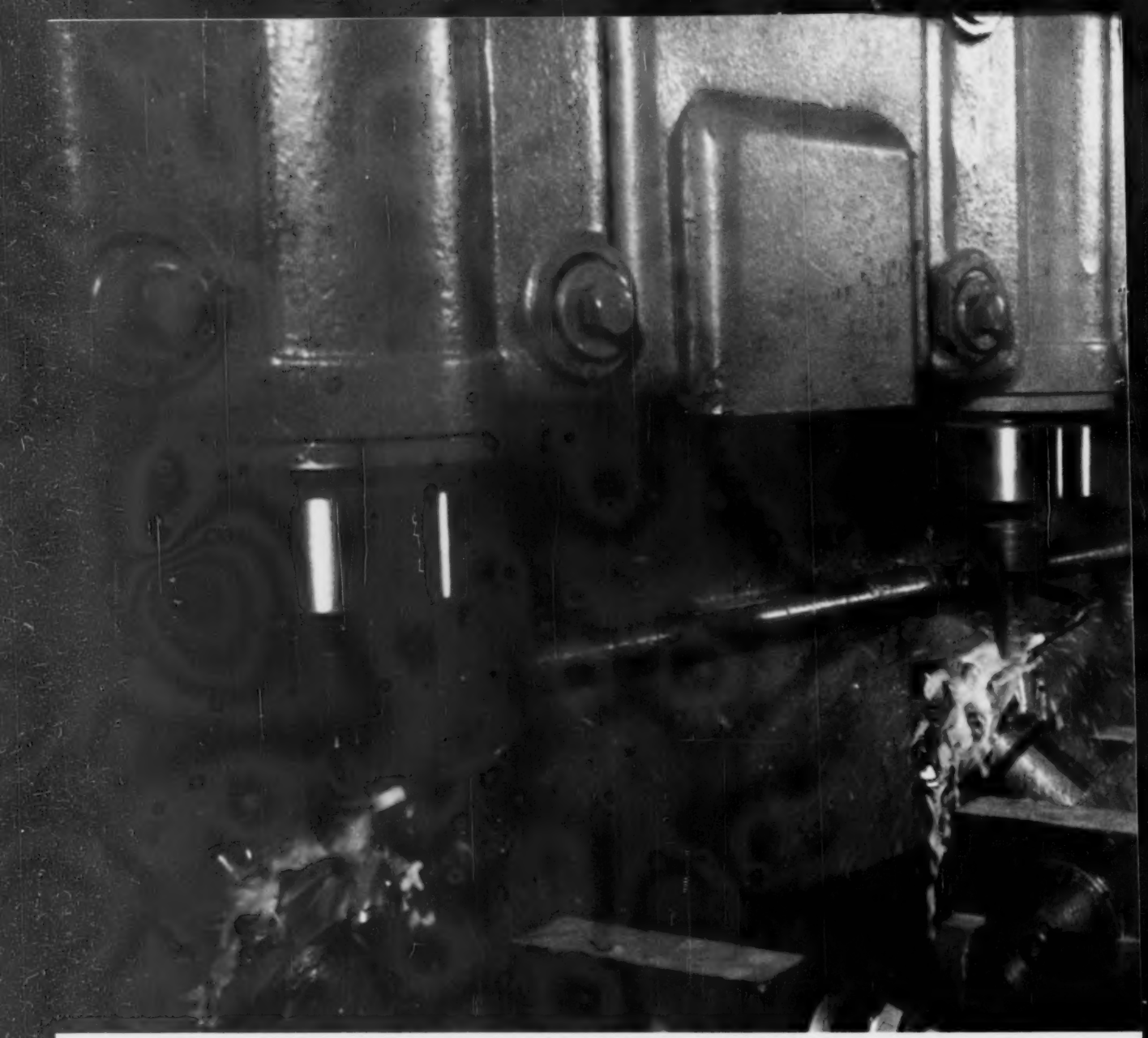
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens
Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro Dehazers

HENDRICK Manufacturing Company
Carbondale, Penna.

Gentlemen:

☐ Please have representative call.
☐ Send me FREE literature on Hendrick Ornametal.

Name_____
Title_____
Company_____
Street_____
City_____ State_____



Milling teeth in rock bits on a 4-spindle machine. The coolant: Gulfcut Heavy Duty Soluble Oil.

Change to Gulfcut® Heavy Duty Soluble cuts maintenance costs . . .

Varel Manufacturing Company has supplied rotary drilling tools to the oil industry for many years. Recently, this Dallas, Texas, firm had to battle a severe rust problem—in gearboxes and on finished parts.

The company turned to Gulf for help. And got it. Gulf Engineers recommended Gulfcut Heavy Duty Soluble Oil in place of the chemical coolant then in use. Result: no more rust!

"By eliminating rust, improving lubrication and cooling," says Malcolm Thomas, Production Manager, "we brought maintenance costs down to earth. Before the switch, our gearboxes got so rust-infested that we had to down machines for a whole day to clean them. But that's no longer a problem—and neither is paint peeling.

"Here at Varel, we use a mixture of 30-40 parts water to one part oil. And we've found that Gulfcut Heavy Duty Soluble Oil meets every one of our machining requirements."

If you're faced with a stubborn machining problem,

Oil eliminates rust and paint peeling,
GULF MAKES THINGS RUN BETTER!

give us the opportunity to show you how Gulf makes things run better! Call a Gulf Sales Engineer at your nearest Gulf Office. Or write for Gulfcut literature.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building
Houston 2, Texas

R. J. Blanton, left, Executive Vice-President & General Plant Manager of Varel Manufacturing Company, and Grover Garrison, Gulf Sales Engineer. In the foreground, a 12¼" VHI rock bit.

SP-10049

pure nickel for critical alloying

When the specifications call for *pure* nickel, you can count on Sherritt as a reliable source of supply. Sherritt's unique hydrometallurgical refining process yields nickel powders with a purity of 99.9%. This high-purity nickel comes to you in handy briquettes and in three grades of powder for faster, easier alloying. The low chilling property of Sherritt briquettes and powders makes them particularly desirable for alloying additions at the end of the heat. Special nickel grades and coated powders are also available. FOOTE MINERAL COMPANY *is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For complete illustrated brochure with prices and delivery information, contact the Foote Mineral Company, 438S Eighteen West Chelten Building, Philadelphia 44, Pa.*

SHERRITT GORDON MINES LIMITED

"WE SELL STEEL" was the theme of a recent auto sales drive in Middletown, O., that in three months boosted sales 57 pct. Launched by new car dealers in the headquarters town of Armco Steel Corp., the promotion carried the idea that more car sales meant more steel production. With the steel company cooperating, new car sales in the area ran almost four times the national sales increase. Other towns are doing it now.

JOB STAMPING COMPETITION from U. S. shops has stirred Canadian shops into action. They have complained that they are losing business to U. S. stampers who can bring in an item and beat local prices. Now the Canadians are holding meetings to meet the threat. But U. S. stampers, with gaining domestic orders, will probably ease the pressure themselves.

CAPACITY OPERATIONS BY YEAR END are forecast for Great Lakes Steel Corp. by president W. D. MacDonnell. He says activity this year will be just the opposite of 1960. Then, the capacity curve moved from top to bottom over the 12-month period.

SALES OF MAJOR APPLIANCES continue to lag. A retail trade survey made at the end of April showed sales dips for most major appliances from year-ago figures. In the first quarter, all major electrical household appliances, except dishwashers and dehumidifiers, showed sales drops from last year's first quarter. The two excepted items made only modest sales gains.

AUTO PRODUCTION, in the second week of May, hit a year high of 131,058 units. This is about 5 pct above the previous week's total. But it is about 10 pct under year-ago production.

SMALL BUSINESSES are flocking to SBA for loans. The agency approved a record high 483 loans totaling almost $22 million in March. This is a 39 pct dollar value increase over February. Loans are used largely to buy equipment, machinery, and production materials. Lists of companies winning loan approvals, on a state-by-state breakdown, are available from SBA.

SALES OF PRIVATE AIRCRAFT are expected to double by 1965. Present sales run around $200 million yearly. This is a forecast of the Aerospace Industries Assn.Also forecast: A doubling of 1965 sales by 1970.

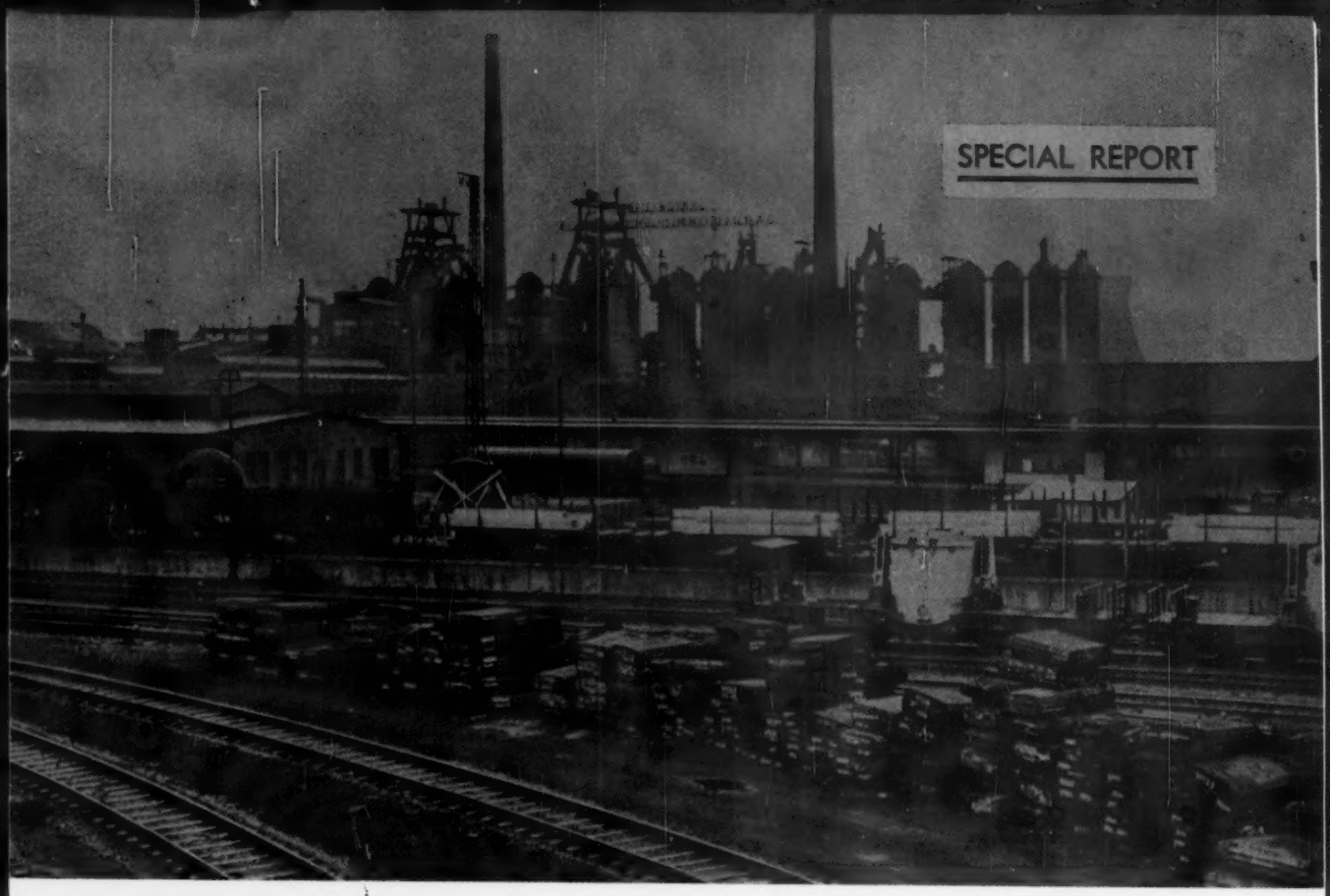
discovered—how to successfully harness **calcium** and **rare earth metals** in your high grade steel. From the AMMET research and development laboratories comes *LANCERLOY 802, the ingenious alloy discovery. LANCERLOY 802, the low-cost ladle addition, lowers oxygen content, minimizes "roping" in Stainless 430, increases ductility at all temperatures and increases rollability of stainless and fine grain steels. Discover how LANCERLOY 802 can save you dollars per ton. Write, wire or call

*All Patent Rights Reserved

AMMET

AMERICAN METALLURGICAL PRODUCTS COMPANY, INC.

9800 McKnight Road · Pittsburgh 37, Pa.
Telephone · WEllington 1-5040



Close-ups of Industrial West Germany

West Germany: Economy Booms, But Not Without Problems

The German economy continues to move at a spectacular rate, especially its industry.

But the country has a severe manpower shortage, housing is a problem, and inflation is beginning to build up.

By E. C. Beaudet

■ From the bustling port city of Hamburg in the North to the humming machine tool centers in the Southwest, the West German Economy continues its decade-long economic boom.

As yet there are few signs of a major economic slowdown on the near horizon. Rather, the big question is how to keep the boom from getting out of hand.

So far, the revaluation of the Deutsche Mark has done little to take the steam out of the inflationary buildup.

And it won't, as long as: Money supply keeps growing; wages gain on productivity; shortages still exist; private and industrial construction keeps active; and labor demand runs impossibly high.

Facts of Life—These are the economic facts of life for West Germany in 1961. They are borne out in visits to steel plants in the Ruhr, machine tool plants in the Southwest, auto parts makers in Stuttgart, bearings plants in Schweinfurt, auto plants in Wolfsburg, Hanover and Russelsheim and talks with financial experts in Frankfurt.

Along with the inflation threat, business conditions in metalworking industries are running at a high level most everywhere you look.

At the machine tool plant of G. Boley in Esslingen, export manager Ernst Hirsch reports two-year delivery times on most of the company's line of semiautomatic drilling

and tapping machines and lathes.

Some Leveling Off—The high demand for tools from this medium-sized builder comes from all quarters: Farm machinery makers, auto plants, camera manufacturers and producers of all kinds of electrical equipment.

Mr. Hirsch, however, does note some leveling off of orders in the industry. For some companies, making standard lathes, backlogs are down to seven months or less. But the two-year backlog still holds for the better-known companies.

Of its total export sales, 75 pct of Boley's output goes to Common Market and Outer Seven countries. The rest goes to Eastern bloc nations, South America, Asia, Australia and the United States.

Turkish Workers—The company does not sell many machine tools in the United States. But it did a good business last year in small jeweler's lathes for the electronic and watch-making industries.

On April 1 Boley, along with other metalworking plants in southwest Germany, took a 5 pct increase in total wage costs. This followed an increase last July by less than a year and the company may have to raise prices to make up for it this fall.

The company is short on skilled labor and has hired some Turkish workers to take over less skilled jobs. At the same time, it is completing a new building to house 450 employees.

Wages Climb Sharply—As the overall figures show, the business picture at G. Boley is not untypical of most West German metalworking companies.

In 1960, gross wages and salaries in West Germany ran 9.4 pct ahead of 1959 and outstripped a 6.4 pct gain in productivity. This year labor leaders are even more actively seeking wage increases than they did in 1959 and 1960. They are shooting for an average boost of 10 pct.

Moonlight on the Rhine—The labor shortage is so severe that imported labor now makes up 2 pct of the nation's labor force. And despite the presence of 400,000 workers from Italy, Spain, Greece and Turkey, the West German government figures the labor force must grow by another 360,000 to raise the gross national product 5.5 pct this year.

NEXT WEEK

Report from Wolfsburg

In an exclusive interview next week, Prof. Heinz Nordhoff, head of the Volkswagenwerk, gives his views on the West German economy, tariff barriers, U. S. imports and world auto demand.

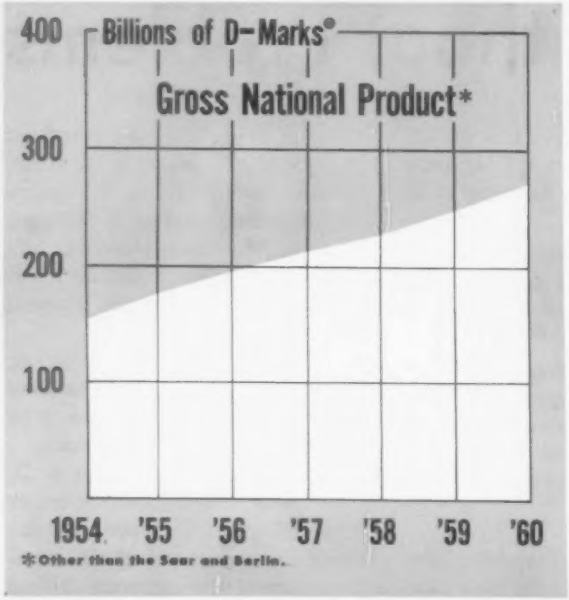
In March, for the first time, the number of open jobs surpassed the number of registered unemployed. But even as low an unemployment figure as 0.8 pct is suspect. Like many workers in the U. S., German factory employees have taken strongly to moonlighting.

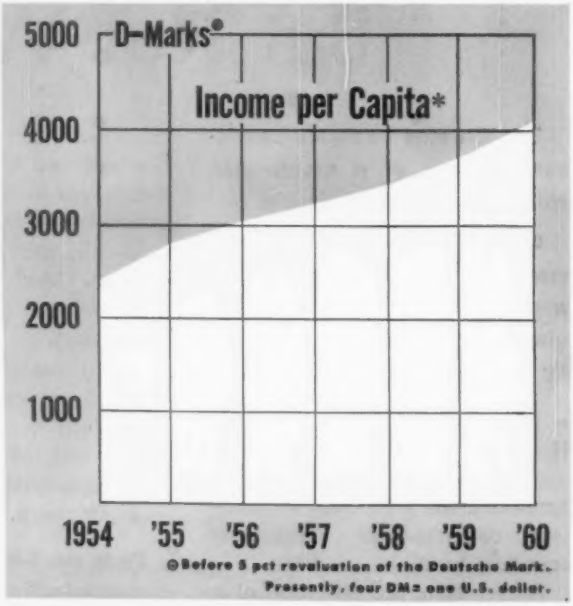
Brake Industrial Expansion—Spurred on by the manpower shortage and the solid strength of the economy, West Germany industry is pouring mark after mark into new plants and labor-saving equipment.

To moderate the expansion and funnel more activity into badly-needed home construction, the West German government has steadily lowered depreciation rates for industry.

In 1956 and 1957 a 28 pct ini-

Wage Gains Outstrip Productive Growth





tial-year allowance over a ten-year declining-balance period was permitted. In 1958 and 1959 the initial allowance was cut to 25 pct. And just last year it was lowered to 20 pct.

But Investment Grows—But so far this move has done little to slow down industrial expansion. This year started off with industrial production passing January 1960 by a good 10 pct, without much help from a hard-pressed labor force.

And in every month this year investment in new plants and equipment increased 15 pct over the corresponding month in 1960. Nowhere is this industrial buildup more clearly seen than at the Volkswagen plants in Wolfsburg and Hanover.

Otto Hoehne, Volkswagen's chief of production, claims the company is putting $200-$250 million yearly into plant expansion and modernization. The reason: To meet the steadily rising demand for its cars and to keep costs under control.

Buy American—New equipment must be justified in terms of cost savings or quality in 18 months, Mr. Hoehne says.

A good part, 12.5 pct, of the 4000 machine tools at Volkswagen's Hanover engine plant are of American origin. Of the 280 machine tools making up the engine line for the new VW-1500, fifty came from the United States. Four 1000-ton American presses costing $400,000 are slated for June delivery.

At Adam Opel A. G. in Russelsheim, manpower is also a prime consideration in planning new production facilities. A financial spokesman for the company puts it this way: "The need for higher productivity has given us an impetus to automate, not only to cut costs, but to get anything produced at all."

Long Haul — Opel workers are drawn to the Russelsheim plant from as far as 35 miles away—a long distance by West German standards. The company is building a new plant in the Bochum area of the Ruhr to take advantage of the freer labor market.

STEEL AND AUTOS: Steelmaker Count Eulenburg (left) and automaker Otto Hoehne appraise their respective industries in interviews.

High production industries can buy their way out of the shortage with highly efficient, labor saving machinery. In many cases, this calls for American-built machine tools which enjoy a high reputation and a short-delivery time along with a 25 to 40 pct differential in price.

Bearings Backlog — A case in point is Kugelfischer, Georg Schaefer & Co. in Schweinfurt, the second largest maker of bearings in West Germany. Georg Schaefer, Jr., reports a demand for the company's products, running equal or better than 1960, which can't wait for longer deliveries of German tools. "Although the prices are higher," he says, "we can't afford to hold up production."

Adding to his company's order backlog are bearings for the Indian railway system which tie-in with a plant his company is building in Calcutta to make axle boxes.

Steel Slowed—The steel industry in West Germany is slackening off a bit after a big year in 1960. At that time the industry turned out 35-37 million metric tons of ingots. This was 16 pct higher than in 1959.

However, the industry does count on increasing its yearly domestic output an average of 4-5 pct for the next five years.

Of the 1961 market, Count Eulenburg, a director of Phoenix-Rhein rohr A.G., Dusseldorf, says, "Business is slowing down a bit. We had a boom after the steel strike in the United States, but this has tapered off. After a dropoff in the first two months of this year orders were a little higher than in March and April."

Money to Spend—The change in the value of the D-mark has had little effect on West German steel exports. "We thought it would be worse," Count Eulenburg reports. "Export orders hesitated for a while but then started to pick up again."

But labor shortages and D-Mark revaluation are only part of the problem accompanying West Germany's expanding economy.

Construction prices have increased 30 pct in the past four years. And despite the efforts of both government and industry, the 2-million unit housing shortage will be around for some time.

Reprints of this article are available as long as the supply lasts. Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Ask for Reprint **No. 172**

Employee Training Job Grows

Automation Forces Shift in Company Training Plans

Steel company training executives pointed to new trends at meeting of American Society of Training Directors.

Training of older employees is a new need. And training on the employee's time is a growing development.

■ "The attitude of our management is that a multi-million dollar plant modernization program doesn't mean anything unless employees are also modernized."

This is what Republic Steel Corp.'s training counselor, Joseph S. Kopas, told a ferrous metals industry group meeting at the annual conference of the American Society of Training Directors. The point made by Mr. Kopas highlights the big job ahead for training directors and U. S. industry: Technological advances threaten a growing technological unemployment problem.

One point emphasized in Republic's training, says Mr. Kopas, is that "all employees are included." This recognizes that some of the employees "hardest hit" by automation and other technological advances are in the "50 and up" age group.

Trends Noted—Attention to the problems of the older worker was one trend noted by the group. Three other trends noted:

More and more training is being given on the employees own time.

More training is being given on needs and wants as expressed by employees themselves, rather than on programs determined entirely by training directors or management.

A shift in attitudes of training managers is toward considering training as a "continuing process" rather than a "series of programs."

Employee Interest — Allegheny Ludlum is one company that stresses training on employees' time. Howard T. Lentz, training coordinator for the company, reported a 98.5 pct attendance record by foremen in one recent lengthy series of training sessions.

Allowing the employees to have a say in determining training programs has paid off for Jones & Laughlin Steel Corp., according to Karl R. Brunt, assistant director, organization planning. "At J&L," said Mr. Brunt, "a vice president must request a training program for his division or group.

"This has worked well," says Mr. Brunt. "Training leaders are assured cooperation by subordinates of vice presidents who take courses. This gives the strength of a 'line' approach, rather than a 'staff' one."

Continuous Program — An example of a continuing training plan is one at Lukens Steel Co. George L. Germain, supervisor, development and training, described an orientation plan for all "hires" where a college degree is required.

"This is a continuing thing," he said, "but individually tailored for each person." For periods varying from two to eight weeks, new employees are routed to various departments of the company. During this period, the employee is on the payroll of the training department.

The time and routing of the employee through this training varies with his experience, his speciality, time available from supervisors, and so on. At the end of the training period these employees write a critique of the course. This write-up is useful to training heads in shaping future orientation plans.

"Operating people endorse the idea even though it takes much of their time," says Mr. Germain.

The course closes with a social session at a local club where the new employees—and their wives—meet the company president and other officers.

New Ideas About Training

"Any training plan should include employees of all age groups. Some of the employees hardest hit by automation and other technological advances are in the 50-and-up age group." **J. S. Kopas, training counselor, Republic Steel Corp.**

"We stress training of employees on their own time. This can work. Recently, we had a 98.5 pct attendance in one lengthy series of foremen training sessions." **H. T. Lentz, training coordinator, Allegheny Ludlum Steel Co.**

"Give employees and line management a voice in determining training programs. Ask them what they want and need in the way of training." **K. R. Brunt, assistant director, organization planning, Jones & Laughlin Steel Co.**

"Think of training in terms of a continuous process, not as individual programs. This aids in long-range planning and employee acceptance." **Jack DeHart, training director, Lynchburg Foundry Co.**

REMOTE CONTROL: Brunswick Corp. uses two Baker lift trucks with remote controls to locate radomes and mandrels for aircraft and missile nose cones.

DUAL PURPOSE: Automatic Transportation Co.'s material handling equipment serves a dual purpose—in overhead maintenance work or vertical pickups.

Handling Cost: It Can Be Cut

Automatic tools and trucks can help industry cut costs in material handling.

New models and adaptations are being unveiled across the U. S. in regional shows sponsored by the Material Handling Institute.

■ New ways to cut costs will always interest industry.

The Material Handling Institute is proving this. Thousands from all areas and types of industry are turning out for MHI trade expositions across the nation. The fourth in MHI's regional series was held in Philadelphia last week.

Technical sessions form part of the show package. American Material Handling Society, Inc., is handling this aspect.

Labor Costs—Metalworkers were particularly interested in the Eastern States displays. And in a preshow conference they got a sharp insight into labor costs from James R. Bright, Harvard Business School professor.

He pointed out material handling labor costs in metalworking run between 5 pct and 40 pct of total labor operating costs.

"A 10 pct figure means your company is doing a fairly good job," he said.

Vital Need — In opening the show, MHI president Robert F. Moody said, "Industry in the Middle Atlantic area vitally needs cost-cutting and increased production facilities assured by modern material handling and protective packaging systems."

In their exhibits, most compaines accented automation as the key to lower labor costs and higher productivity. Their products range from automatic nailing and screw driving to electronically-guided, driverless industrial trucks.

Hidden Costs — Yale & Towne Manufacturing Co. pinpointed 101 hidden costs in material handling in its display of tools and carriers to slash them. A warehouser was demonstrated in conjunction with storage racks to point up waste space in aisle widths and between stacks of stored material on pallets.

Acme Steel Co. displayed cost-cutting tools for three industrial areas—steel strapping, high speed box stitching, and high density warehousing.

Atronic Products, Inc., displayed systems for sorting, counting, inventory control and selective separation of mixed products and conveyor lines.

Arrowhead Products, Inc., featured Pallet Guard bumpers of steel tubing to stop end board breakage and nail failure.

Continuous Casting Faces Test

Steelmakers virtually lost interest in continuous casting about 10 years ago.

Now they are giving it another look. But the backers are moving cautiously.
By G. J. McManus

■ American steelmakers are taking a second look at continuous casting.

One of the largest carbon steel producers has installed a pilot plant. At least two other big mills are running tests on steel from casting machines. Large and small producers are showing new interest in the process.

This interest is starting to produce a few open moves here and in neighboring countries. Under an agreement with Babcock & Wilcox Co., Roanoke Electric Steel Corp. is installing an experimental unit. A commercial plant is being built at Aceros Chihuahua in Mexico by Koppers Co., Inc.

Another Mexican installation is said to be definitely set. Announcement of a Canadian project is due in about a month or so.

Interest Fades Away—This activity comes after continuous casting had apparently dropped out of the picture here. Domestic mills began studying the process more than 10 years ago. Three pilot plants were installed. Inland Steel Co. gave serious consideration to a major production facility.

In 1956, however, Inland decided in favor of conventional equipment and against continuous casting. The company said test results were favorable but "there was not sufficient time available to master all the problems of the new method and to insure perfection of a unit that could be integrated with existing facilities. . . ."

Other mills apparently agreed expansion programs could not wait for all the answers on continuous casting. Orthodox means were used to increase hot-rolling capacity more than 10 million tons over a five-year period. Talk of new casting projects faded away.

But It Isn't Dead—Now, interest is building up again. Reasons for the revival include:

1. Foreign experience has erased a lot of the question marks.

2. The sweeping potential of continuous casting demands attention.

3. New cost pressures, new market conditions and new processes have created a need for new evaluation.

Then and Now—Early experience with continuous casting centered on specialty steels, produced in small sizes from small batches of metal. Much of the activity was experimental.

Today, there are about 40 machines in service and 10 more planned. Most of these are classed as commercial. At Welland, Ont., Atlas Steels, Ltd., has been operating its machine three shifts a day for two solid years.

Many of the newer units are scaled along tonnage lines. Japan's Yawata Iron & Steel Co. recently began operating a single strand machine designed to cast 50-in. slabs and pour 75 tons of steel an hour.

Greater Yield—In England, Appleby Frodingham, Ltd., is building a four-strand unit designed for 100 tons an hour of carbon steel. The Russians are said to go up to 375 tons with a 4-strand slabbing machine.

Behind these and other installations are advantages of high yield

Europe Leads in Continuous Casting Units

Country	Number of Installations	Max. Size Cast	Max. Rate
Austria	3 commercial	6" x 24"	50 Tons/hr.
Canada	1 commercial (1 planned)	6½" x 24"	60 Tons/hr.
England	3 commercial (7 planned) 2 experimental	8" x 66"	100 Tons/hr.
France	4 commercial (2 planned)	8" x 50"	85 Tons/hr.
Italy	2 commercial	5" x 7"	90 Tons/hr.
Japan	2 commercial	6" x 50"	75 Tons/hr.
Norway	1 commercial	7" x 7"	12 Tons/hr.
Spain	1 commercial	7" x 7"	12 Tons/hr.
Sweden	2 commercial	2¼" x 13"	16 Tons/hr.
Switzerland	1 commercial	7" x 7"	18 Tons/hr.
U. S. A.	1 commercial 2 experimental (1 planned)	5" x 15"	11 Tons/hr.
U.S.S.R.	5 commercial 1 pilot plant	10" x 48"	375 Tons/hr.
West Germany	4 commercial 2 experimental	10" x 60"	135 Tons/hr.
Australia	1 commercial (being built)	5" x 5"	10 Tons/hr.
Mexico	1 commercial (being built)	6" x 6"	12 Tons/hr.
India	1 commercial (planned)		

and low capital cost. According to one authority, continuous casting gives about 10 pct more usable steel than conventional pouring. This gain is considered particularly critical with stainless and other expensive steels.

Casting machines do not bypass any conventional steps in many of the present installations; they are used strictly to increase yield.

Cautious Approach—Capital savings become more important when casting machines are used for large slabs and volume production. One backer of the process says the machines cost one-third to one-fourth as much as conventional equipment. It was estimated the space saving for one mill would be 20 acres.

However, continuous casting men are not thinking yet in terms of the volume that goes with a fully continuous hot strip mill in this country. If an American mill has this volume or can foresee it, says one expert, it will find the money and build a conventional installation.

Where producers do not have this kind of volume, chances of continuous casting are considered better in the immediate future. Semi-integrated producers of reinforcing bars are reported showing keen interest. The next Canadian installation will be in this field.

Not Now, But Soon—Stainless specialists are also considered likely prospects. It is estimated a continuous casting machine with a hot planetary mill could be installed for something like $15 million. This might answer the specialist's need to compete with the high speed equipment of large mills.

Backers of continuous casting do not expect a wave of projects in the next few weeks or months. They do expect activity within the next year. Ultimately, they feel, their process has got to become a basic part of all steelmaking.

Studies Continue — Meanwhile, tests, experiments and studies continue. Allegheny Ludlum Steel Corp. says tests continue at Continuous Metalcast Co. but "nothing exciting has happened."

Stampings Get Boost Along Recovery Road

From a dismal first quarter, the stampings industry is moving through a sales comeback.

Outlook: Continued gains, with 1961 equalling, if not surpassing, 1960. Long-range hopes are even more optimistic.
By K. W. Bennett

■ After a slow start, the stampings industry is pushing ahead. It should finish 1961 equalling, if not topping, 1960 sales.

Job stampers report 10 pct sales gains in April. They predict another 12-15 pct advance this month. And June is expected to see sales beating the 1960 monthly level for the first time this year.

It's quite a comeback from the first quarter, when most companies reported 25 pct lower sales than in the same period in 1960.

Long-Range View—Looking far ahead, many stampers are even more optimistic.

J. D. Keith, managing director of the Pressed Metal Institute, told The IRON AGE, "I have a pretty strong feeling that final (stampings) figures for 1961 will be about the same as, or a little higher than, 1960. I have gained the impression that industry is using 1961 to prepare for what it expects will be much better times during the rest of the decade of the '60's.

"Almost without exception, men in the industry are studying 1960 operations more critically than perhaps any previous year, trying to determine ways to emerge from the profit squeeze. Expanded facilities, new and reconditioned equipment, improved materials handling procedures, and technical developments: All are receiving attention in all parts of the country. I feel capital expenditures by the stampings industry will rise in 1961 due to these factors," says Mr. Keith.

East Wind—It's apparent that a growing wave of sales gains, first spotted in the East, is sweeping westward. It touched down in the Midwest in early May. It is still moving west.

A major stamper placed rush orders for 200,000 lb of service center steel two weeks ago. This week he'll boost his work week from 40 to 45 hours.

Comments another, "We've finally started getting nonferrous orders. It only started two weeks ago. But from the orders we've already seen, we're good for the rest of this year."

Inventory Buildups — Reports Northern Metal Products Co.'s C. C. Caditz, at Chicago, "Our May production should advance 10 pct. We recalled some people in April, and we'll recall more this month. The prospect is for a stronger second half. We may begin extending our inventories slightly."

A Midwest stamper, who is sitting tight on his own raw material stocks, says, "Our customers are finally getting off this four-week delivery kick. We're getting orders on 6-8 week lead time. By June you can bet it'll take 8-12 week lead times to get stampings. This is the kind of business increase I like. It's gradual; you can get ready for it. It's a nice, steady gain."

General Pattern—Auto, construction, electrical and electronic buyers have been major factors in boosting several markets. Most gains have been made with some major customers still to be heard from. New tooling work hit the Midwest in April; is still slow in the East.

READY FOR MARKET: Super-strength shapes with yield strengths of 100,000 psi get check at U. S. Steel by F. T. Bumbaugh (l), manager, alloy product sales, and M. M. Chapman, administrative vice president.

Super-Strong Shapes Hit Market

Expect Specialty Product to "Open a Whole New Field"

Rolled structurals have long been one of the few products not made in high strengths.

Now U. S. Steel has come up with super-strength shapes to reduce fabricating costs, open up new applications.
By G. J. McManus

■ Rolled structural shapes, made of super-strength steel, are now ready for market.

United States Steel Corp. is offering rolled structural shapes, quenched and tempered to yield strengths of 100,000 psi. I-beams, channels and angles are available. Alloys supplied include cryogenic and naval armor specialties as well as T-1 and related constructional types.

Product Benefits — According to U. S. Steel, the new product will:

Cut costs for many jobs that involve fabrication of sections from high-strength plates.

Open up the high-strength field to those who are used to working with standard shapes.

In proper applications, benefits are seen outweighing higher material costs.

"Ready rolled shapes of USS T-1 — constructional alloy steel — will cost only about 12 pct more than quenched and tempered plate material," says F. T. Bumbaugh, manager of alloy product sales. "We estimate they'll save the customer about 30 pct as compared to the cost of fabricating similar shapes in his own shop."

Off-the-Shelf Shapes—U. S. Steel also feels if will help to have "super-strength" steel in a convenient and familiar form. According to alloy men, many structural shops are not equipped for the kind of fabrication required to make heavy sections from plates. These shops rely on standard rolled shapes, readily available and requiring a minimum of fabrication.

"Designers can now specify off-the-shelf shapes of T-1 steel . . .," says Mr. Bumbaugh.

Market Prospects—In addition to its special assets, says U. S. Steel, the new product will share the laudable properties common to all quenched and tempered steels: It will permit weight and cost savings by providing three times the strength of carbon steel; it will be available in grades that withstand extreme temperatures, pressure and corrosion conditions.

Regarding market prospects, U. S. Steel is talking conservatively.

Quenched and tempered structurals represent a significant breakthrough, says M. M. Chapman, administrative vice president, commercial. In relating the new product to the overall steel picture, however, Mr. Chapman avoids broad claims.

"This is a specialty product," he says. "It is not going to have a revolutionary impact, but it is going to be used for specialized applications."

Probable Uses — Mr. Bumbaugh is confident the super-strength structurals will meet growth targets. Makers of mobile equipment have been asking for the product for a number of years, he says; T-1 structural shapes have already been specified for one drilling rig. Builders of cranes, trailers and similar vehicles are now fabricating sections from super-strength plates.

In standing structures, cryogenic vessels, and naval hulls, the new shapes are seen expanding usage of the various quenched and tempered grades.

U. S. Steel's alloy group expects the new product to follow the growth pattern of other quenched and tempered alloy steels. They say the exact timing is difficult to pinpoint. But they feel there logically has to be a substantial place for structural plates in the super-strength field. A long period of market development and education is expected.

A look at other constructional steels suggests this is true. More than 4.7 million tons of carbon structural shapes were shipped last year. In the high strength field (50,000 psi yield strength), shapes accounted for over 70,000 tons in 1960.

Fills Product Gap — Only the super-strength steels have skirted around rolled shapes. This group has been developing in many other directions. The range of properties has been extended by U. S. Steel's T-1 Type A and by new grades of other producers.

Rolled structurals have been the one gap in the super-strength picture. Without a standard shape, alloy men have had to work against both accepted strength notions and accepted fabricating practices. They know this has been a handicap in some applications.

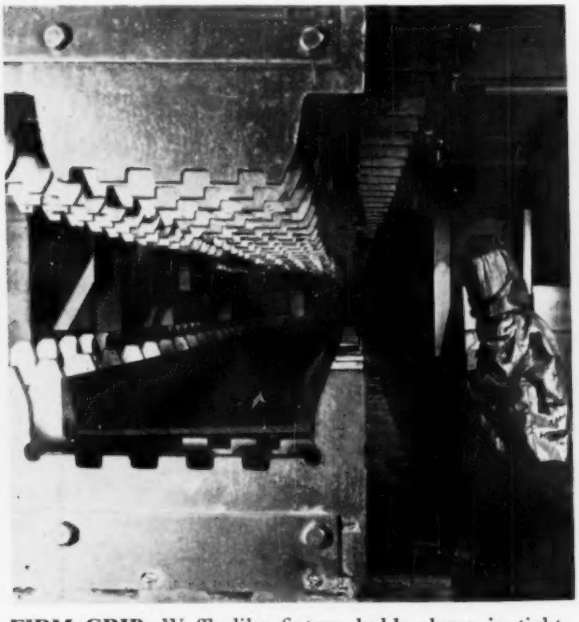
How It's Done—The problem has been to find some practical means of heat treating big sections. U. S. Steel has been actively seeking an answer to this one for years. Early efforts attempted to get rid of distortion effects by mechanical means after quenching.

However, it was found that structural sections twisted into spaghetti when quenched. To combat this, a system of restraining fixtures was developed at the Pittsburgh plant of Van Dorn Iron Works Co.

The fixtures hold shapes firmly during water quenching. They prevent distortion; direct stresses in a beneficial manner. The technique is similar to that used by A. O. Smith Corp for side rails. (IA, April 27, p. 109.)

Customer Reaction — There has not been time for much reaction by structural men to the new shapes. A top design engineer feels they will be "of considerable value." He believes the rolled structurals will be particularly useful for building columns and for bridge trusses under certain conditions.

U. S. Steel indicates it is too soon for any final pronouncements. "We're going to open up a whole new field," says Mr. Bumbaugh. He sees special shapes being designed and rolled to go with the special strength of heat-treated steels.

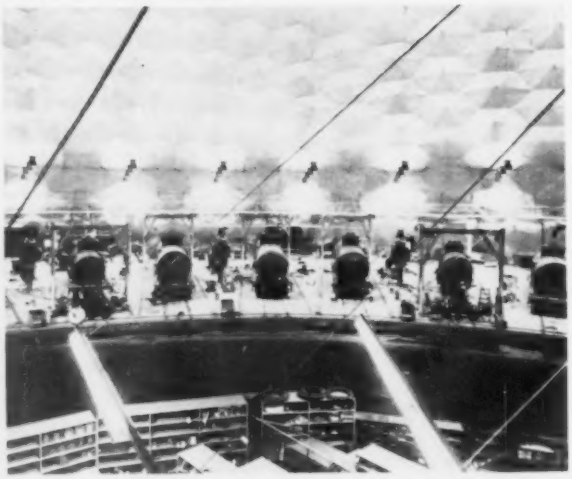


FIRM GRIP: Waffle-like fixture holds shape in tight grip during quenching cycle to prevent distortion.

STRENGTH THROUGH HEAT: After heat treat, structural steel leaves furnace.

All-Steel Dome Covers Railroad Tank Car Repairs

GEODESIC GIANT: Union Tank Car Co.'s huge white all-steel geodesic dome at Wood River, Ill., serves as a regional railroad tank car repair plant.



NO VISIBLE SUPPORT: The spacious interior of the dome features an operational layout designed for maximum speed and efficiency in tank car repairs.

Vacuum Degassing Picks Up Interest

Vacuum treatment of steel seems to be heading for broad commercial application.

This was indicated last week when Crucible Steel Co. of America gave a progress report on its D-H ladle degassing unit.

Crucible's unit is the first D-H type to be installed by a basic steel producer in the U.S. It is the first commercial attempt by a major producer to apply vacuum processing to relatively common steel on a tonnage basis.

Alloy Tests—About 100 heats have been treated. Tests centered on carbon, low alloy grades for forging, bearing and aircraft.

Based on this experience, Crucible offers these findings:

1. D-H vacuum treatment gives significant quality improvement.

2. Cost of treatment can be covered by a price premium of less than 1¢ lb.

Swallow System — In the D-H system, steel is sucked from a ladle into a vacuum chamber in successive swallows. Oxygen, nitrogen and hydrogen gases are pulled from the metal in the chamber. In addition, there is some breakdown of oxides and further gas liberation. Alloy additions can be made in the ladle immediately after degassing.

According to Crucible, this treatment has reduced oxygen content 55 to 90 pct; it has gotten rid of half of the inclusions normally present. The company reports high recovery of additives, extremely precise control of composition.

High Strength — In terms of properties, says Crucible, this has meant higher strength levels, lower rejection rates, greater uniformity and reliability.

Crucible's figures indicate open hearth heats are upgraded to a level approaching electric furnace quality. Electric furnace heats are moved up in the direction of vacuum melting quality.

Double Capacity — The installation can handle heats up to 200 tons. It was initially rated for an annual capacity of 1 million tons.

According to Crucible, this is double the total vacuum melting capacity in the U.S.

At least two major carbon steel producers are showing interest in the D-H process.

Companies Combine To Mine Zinc Ore

Two companies are joining in a $6 million project to mine and mill 20 million tons of zinc-bearing ores near New Market, Tenn.

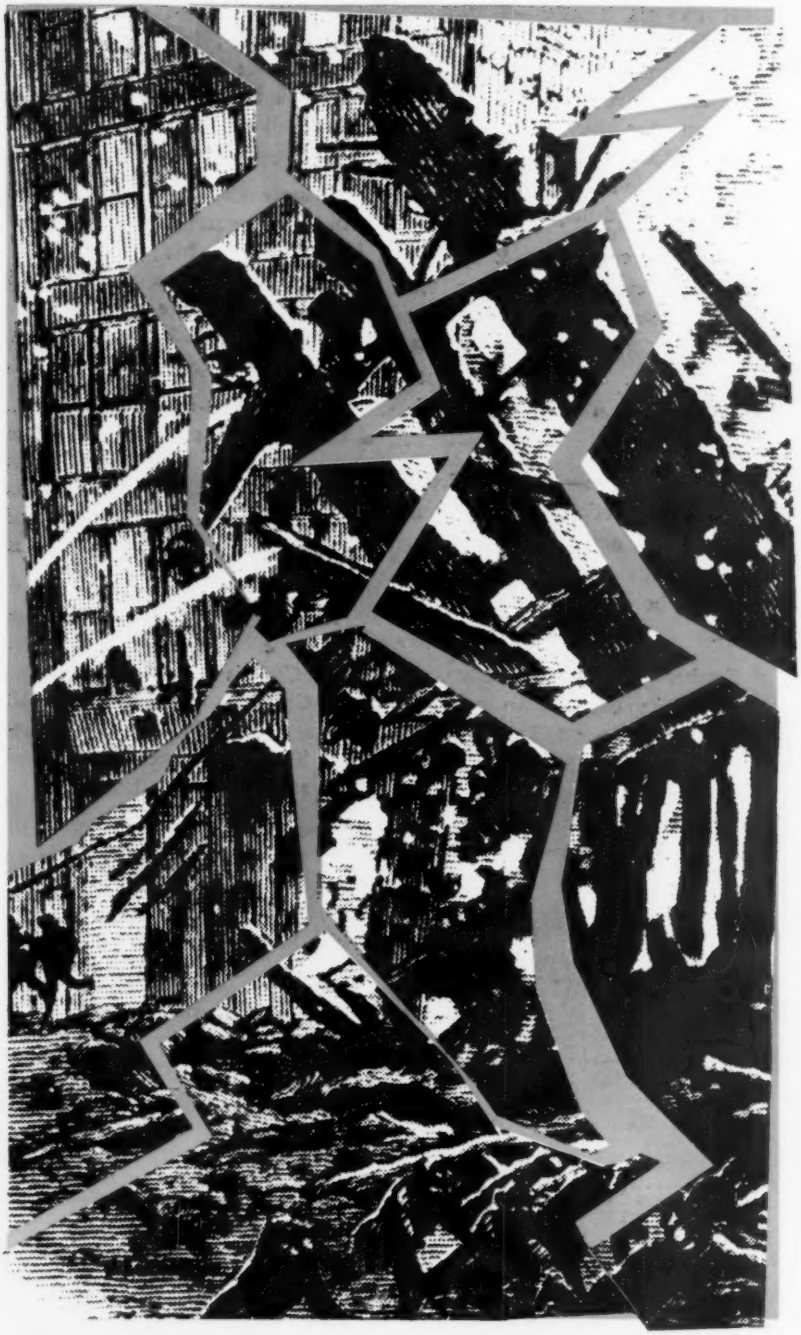
They are Tri-State Zinc, Inc., subsidiary of Gold Fields Mining & Industrial Ltd., and American Zinc Co. of Tennessee, subsidiary of American Zinc, Lead & Smelting Co., St. Louis.

Under the joint agreement, Tri-State will mine and mill the ore deposits owned by American Zinc.

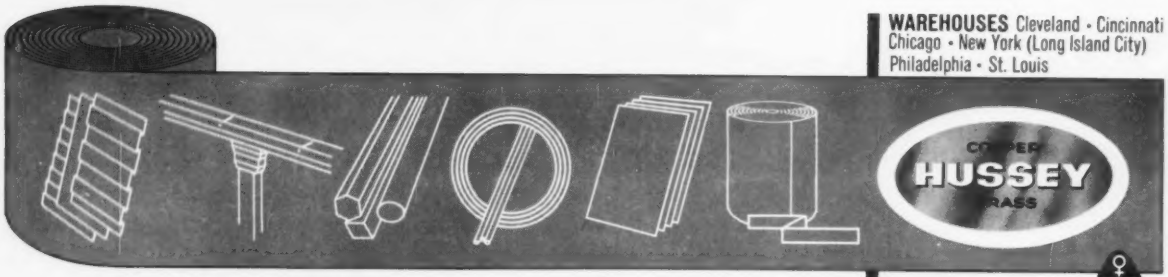
Linde Co. Opens New Flame-Plating Plant

A new plant for applying flame-plated coatings is in full production at North Haven, Conn. It was designed by Linde Co. Div., Union Carbide Corp.

The new structure is adjacent to Linde's gas plant which handles oxygen and acetylene needed for the process. Flame-plating provides greater resistance to wear, abrasion, erosion and corrosion when coatings of hard substances (tungsten carbide or aluminum oxide) are applied to parts made from base metals.



On April 18, 1906 when the great quake hit San Francisco, Hussey had a solid reputation for quality copper for 58 years



WAREHOUSES Cleveland • Cincinnati
Chicago • New York (Long Island City)
Philadelphia • St. Louis

C. G. HUSSEY & COMPANY • PITTSBURGH 19, PA.

DIVISION OF
COPPER RANGE COMPANY

INDUSTRIAL BRIEFS

Cooling Entry—Birtcher Corp., Monterey Park, Calif., has launched a research and development program into cooling systems using thermoelectric devices. Object is to provide systems and sub-systems for industrial and commercial applications.

Japanese Venture — Kawasaki Steel Corp., Kobe, Japan, has opened offices in New York at 26 Broadway.

All Together—All manufacturing facilities of Sun-Heat, Inc., of Holt, Mich., have been moved to Detroit. Heaters are being produced at 998 East Woodbridge Ave.

West Coast Arm—H. H. Robertson Co., Pittsburgh building products manufacturer, is opening a new plant at Stockton, Calif. It will produce cellular steel roof and floor deck and insulated metal curtain walls.

Rockwell Trade—Rockwell Manufacturing Co. and distributors of Delta and Walker-Turner industrial tools have started a trade-in program for buying new drill presses. Rockwell has also set up a uniform guide to determine trade-in value of older drill presses.

Good Mixer—Drake & Townsend, Inc., New York, has completed a propane-air standby plant at Hapeville, Ga., for Crown Cork & Seal Co., Inc. High-pressure gases are mixed by Draketown's "Multi-Jet" mixer.

Jackson Move—Jackson Products, Air Reduction Sales Co., has moved into a new plant at Warren, Mich. Jackson produces welding electrode holders and safety equipment.

Further Foil—Clevite Corp. is doubling its capacity to produce electrolytic copper foil for printed circuits. It is produced at the Cleveland Graphite Bronze division.

Aluminum Pushes Ahead in Housing

A NEW TREND: Within three years, this $50 million housing project should be ready in Pittsburgh. To be known as Allegheny Center, it will feature aluminum apartment buildings, town houses, a shopping center and underground parking. A similar aluminum project was started in Philadelphia recently and a new trend may be developing.

Bearing East — New Hampshire Ball Bearings, Inc., is building a new plant at Laconia, N. H. Products will be miniature and instrument ball bearings for data processing equipment and computers.

Remote Control—A radio controlled bridge crane at the Joseph T. Ryerson & Son, Inc., Chicago plant is reported to be the first operating in any steel service center in the U. S. It was produced by Jerome Tannenbaum, electronic consultant.

Bigger Site — Crowell Tube Co., Lexington, Mass., subsidiary of Nuclear Metals, Inc., is moving its plant and offices to larger quarters at Somerville, Mass. Production of small diameter precision seamless metal tubing will be expanded.

Extra Crushers — Bethlehem Limestone Co. Div., Bethlehem Steel Co., is installing two new Allis-Chalmers crushers and 10 screens at the Hanover, Pa., quarries. They will increase the sinter sand and stone plant facilities.

Dixie Grows — New plant additions will increase facilities over 50 pct at Dixie Tool Industries, Inc., Bridgeport, Mich. The construction will house a complete new automatic fluting equipment line.

Into Orbit—American Orbitronics Corp., missile component manufacturer, has opened executive offices in Washington, D. C., and a 30,000 sq ft plant in Hawthorne, Calif. Among the products are nozzles and stators fabricated of exotic metals, and rotary wheels.

Spreading Out—Westinghouse Electric Corp.'s air conditioning division will spend $2 million expanding warehouse and production facilities at the Staunton, Va., plant.

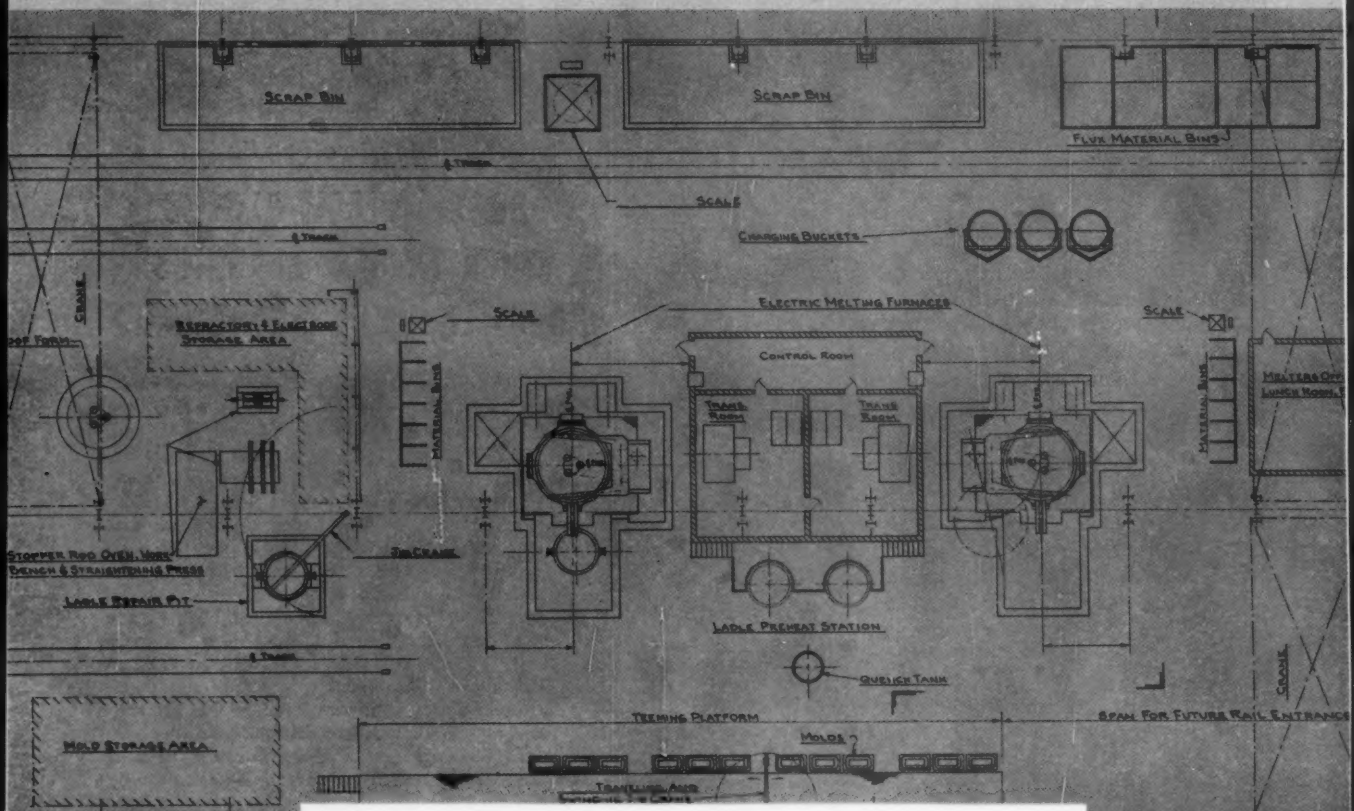
June Move—John A. Roebling's Sons Div., Colorado Fuel & Iron Corp., will move its New York and Philadelphia offices and warehouse to Adams Station, N. J.

Quebec Shift—Harper Everlasting Fastenings, Ltd., has opened a new warehouse in Montreal. It will carry a complete stock of non-ferrous and stainless steel fasteners.

SWINDELL-DRESSLER

ONE HUNDRED AND TEN YEARS OF SERVICE TO THE METALS INDUSTRY

ENGINEERS and CONSTRUCTORS



- **COMPLETE ELECTRIC STEEL MELT SHOPS**
- **COMPLETE BASIC OXYGEN STEEL PLANTS**
- **COMPLETE INTEGRATED STEEL MILLS**
- **COMPLETE GAS CLEANING SYSTEMS**

Consultations Gladly Arranged

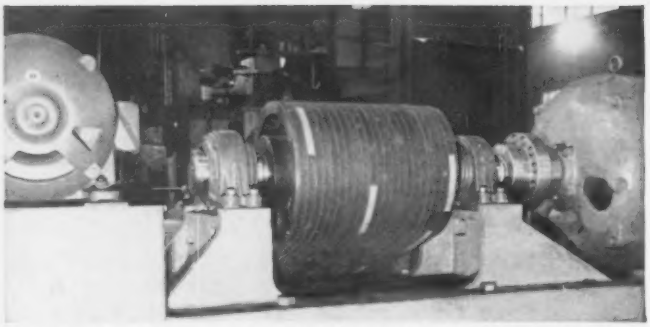
SWINDELL-DRESSLER CORPORATION

Engineers • Constructors • Manufacturers

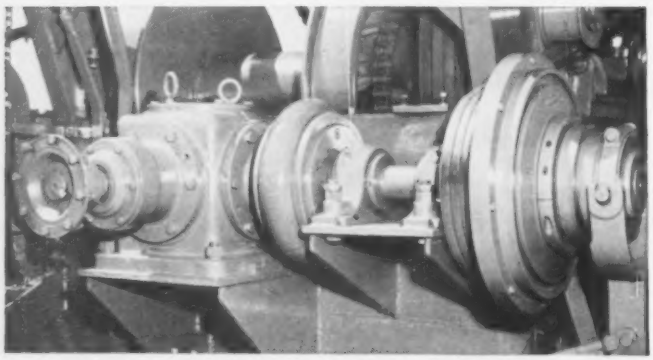
PITTSBURGH 30, PA.

The SWINDELL-DRESSLER CORPORATION of Canada, Ltd.,
Ottawa, Canada

SUBSIDIARY OF PULLMAN INCORPORATED

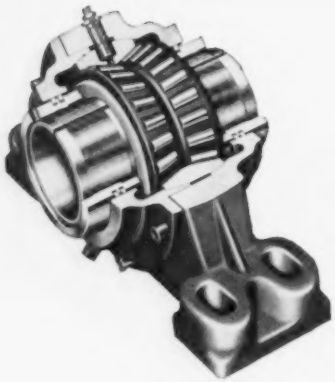


Timken bearing equipped Dodge All-Steel Pillow Blocks used on steel mill hot saw.



Dodge Type "E" Pillow Block with Timken bearings used on drive hookup of a rotary table.

Dodge 7" Special Duty Pillow Blocks with Timken bearings used on skip hoist bull wheel at a steel mill.



From steel mills to oil wells . . .

DODGE PILLOW BLOCKS WITH TIMKEN® BEARINGS BOOST LIFE, CUT MAINTENANCE

Pictured here are three of the wide range of applications where Timken® bearing equipped Dodge Pillow Blocks handle tough jobs with minimum attention. They last longer, cut maintenance because: 1) Timken bearings are tapered to take *any* combination of radial and thrust loads. 2) They have smaller radial running clearances than axial internal clearances, providing more effective sealing, holding shafts on center for extra precision. And, 3) Timken double-row bearings are designed to permit positive lubrication. New grease can be added directly to the center of the bearing and seal. It forces out old grease, lengthens bearing life, cuts maintenance.

The cutaway view shows Timken bearings in the Dodge All-Steel Pillow Block. The specially designed bearing has a tapered bore with self-aligning spherical outer surface—never needs adjustment.

Timken bearing equipped Dodge Pillow Blocks include the All-Steel, Special Duty, Type "C", Double-Interlock and Type "E"—cover every engineering need. And with Timken bearings, space consuming thrust devices are not needed. For your No. 1 bearing value, specify "Timken".

The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ontario.

Industry rolls on

TIMKEN®

tapered roller bearings

More Efficient Control Needed

Faced with complex business problems, today's managers must exert a new efficiency.

But such efforts now will assure better management in the future.

■ These are difficult times for business managers. Problems were never more plentiful.

Fighting the recession (the second in four years) is only one of the difficulties. Among others are foreign competition, the cost squeeze, falling profit margins, and renewed action by the government in business control.

To all these must be added the "black eye" business has received as a result of the price-fix and conflict of interest cases. It's hard drawing any optimism from all these woes.

Long - Range Benefits? — But, nevertheless in the long run business may benefit in some ways. Action brings reaction. Problems demand solution. And business will adapt to overcome these difficulties.

The foreign trade situation already shows what can be done. After declining, U. S. exports have staged a comeback. Selling overseas is not easy for many U. S. manufacturers. But more effort and thought is now going into export selling. The results reflect that energy.

Less Togetherness—Perhaps one of the most important changes coming about is in management thinking. The "togetherness" concept of management is running into trouble.

In the harsh realities of the 60's it doesn't look as promising as it did when the selling was easy. The trend toward management by committee, group thought, and decentralization has slowed down or halted.

James M. Black, discussing these trends in the Management Review of the American Management Association, sums it up this way:

"More and more managements are accepting the fact that a business enterprise is not the ideal place for group therapy and life adjustment."

In this light, he notes, many managements are re-evaluating executive development programs.

Some Guideposts — Each company must tailor its development program to its own needs. But Mr. Black lists several general principles that can be helpful in appraising your own program.

First, don't rely too much on data produced by other companies or by universities. Then keep in mind that development is an instrument to add efficiency in the selection of competitive leadership. Promotion should be open to all, but individuals must make some effort to get it.

Don't get absorbed in techniques. Move toward the objectives of management development. In teaching trainees, use generalities to make specifics meaningful.

Lastly, define your goals in understandable English. Avoid pompous, pseudoscientific, and sociological jargon.

How Local Spending Helps

■ One source of business—spending by state and local governments —has increased spectacularly in the period since World War II.

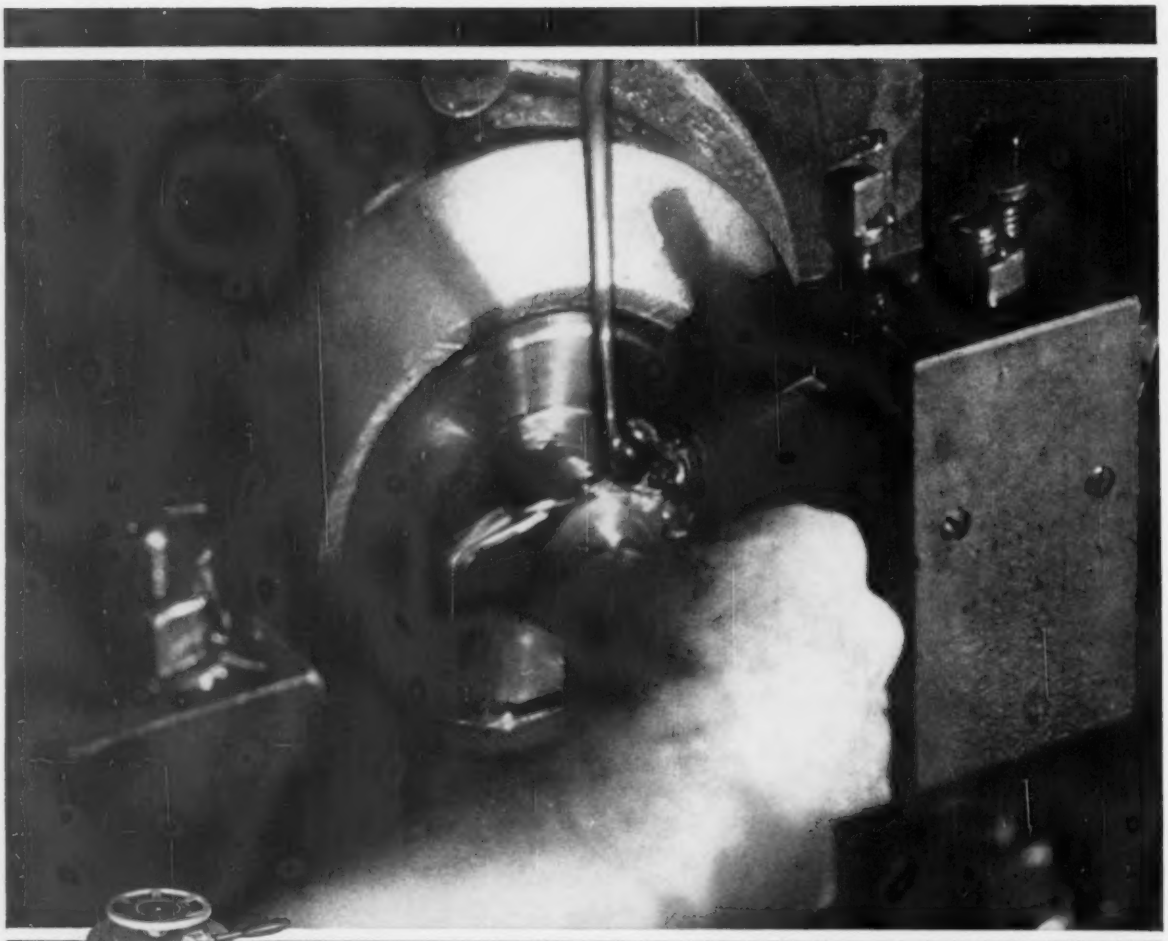
This rise has been important to industry from another angle. It has been largely immune to dips in the general business cycle. As a result, it's a positive factor even in times of recession.

Bigger Share of GNP — This spending by state and local governments advanced from $7.5 billion in 1944 to $47.3 billion in 1960. This year the Dept. of Commerce estimates it will be at a new record of $51 billion.

Goods and services purchased by non-Federal governments account for a growing portion of the Gross National Product. The annual expansion has averaged $3 billion.

Schools and Roads—As might be expected, the major portion of this spending has gone for schools and highways. These two categories account for half the total outlays in recent years. Other expenditures were for general government, health and sanitation, public assistance, and civilian safety.

Twenty pct of all new construction put in place in the U. S. last year resulted from spending by state and local governments.



COOL CUTS

Keeping close tolerances is of prime importance at Diagraph-Bradley Industries, Inc., of Herrin, Illinois, leading manufacturer of stencil machines and accessories. One of the ways this is accomplished is by keeping cutting edges cool.

At Diagraph-Bradley stencil punches must be cut and held within .0005 of an inch—a fine point of precision Diagraph-Bradley attributes to the cooling and lubricating effect of Cities Service Chillo 10 cutting oil.

"You have only to take a Diagraph-Bradley machine," says one of the company officials, "cut a stencil with it and look at the resulting letter to realize how important the right cutting oil is to our production."

Cities Service Chillo 10 oil is a sulphochlorinated oil. The concentrations of sulphur and chlorine are stabilized by a special process, assuring uniformity of action through the entire cutting operation.

That's why, with Cities Service Chillo 10 cutting oil, work is always more accurate, clean and cool!

For full information call your nearest Cities Service office or write Cities Service Oil Company, Sixty Wall Tower, N.Y. 5, N.Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Gloves Off in Auto Bumper War

Steel and Aluminum Collide Head-On

A real fight is underway for Detroit's $40 million bumper market. Steel is out to stop aluminum inroads.

Great Lakes Steel Corp. even unleashed an anti-aluminum bumper advertising campaign.
By A. E. Fleming

■ A full-scale bumper fight is being waged in Detroit. Opponents are Great Lakes Steel Corp. and the aluminum industry.

The prize: A sizeable bumper market.

The spectators: Automakers and the public.

Bumpers take about 250,000 tons of steel in a six-million car production year. This is a $40 million market for steelmakers. About 70 pct of all bumpers are made in Michigan. Great Lakes Steel is the nation's largest producer of steel for bumpers. It's a title the company wants to keep.

Gloves Off — Says Great Lakes president W. D. MacDonnell: "For several years we've heard and read aluminum bumper advertising that discusses the aluminum bumper in the present tense. Aluminum producers have exerted intensive effort to supplant steel bumpers. But the aluminum bumper isn't on an American car. And the competitive aluminum bumper is still a dream.

"However, the advance sell strategy has forced steel to compete for recognition with a non-existent product. Now we're taking our gloves off."

The first big punch came in the form of three-state radio commercials. These commercials identify aluminum as "a satisfactory metal for pots and pans and for wrapping leftover food, but as something else again for automobile bumper use."

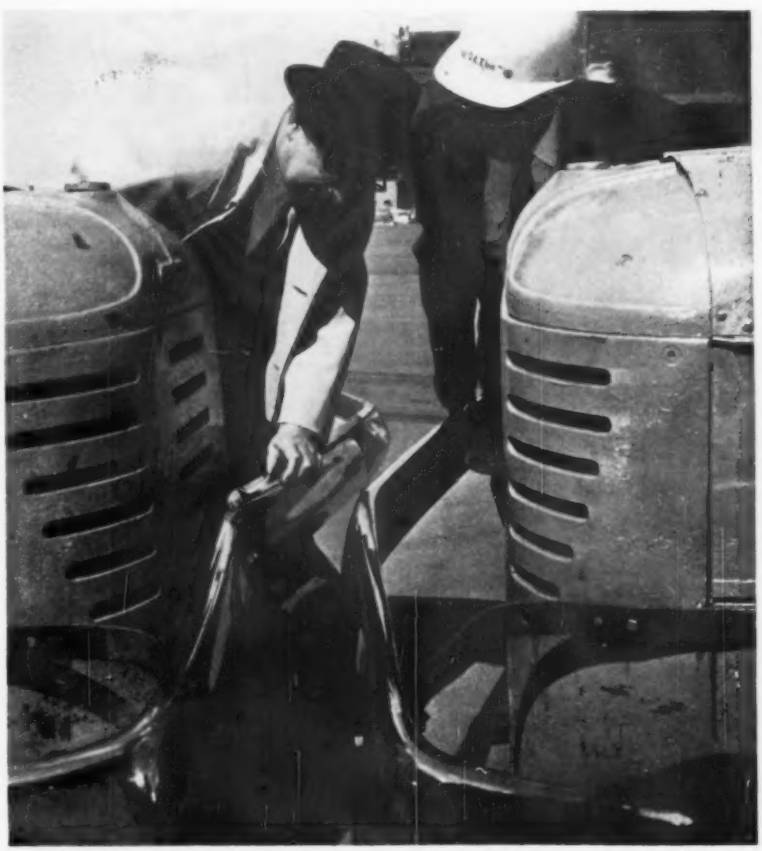
Not Worried—The aluminum producers don't appear worried. "It's wonderful for us," says one producer. "The longer they keep this up, the more free publicity we get."

The aluminum industry comes back at steel with these arguments: An aluminum bumper could be competitive with chrome - plated steel in cost. This is because of lower tooling cost, less stock preparation, and cheaper anodizing.

An Aluminum Company of America official also notes that aluminum has been used on commercial vehicles since the 1930's.

Problems — But aluminum producers face hurdles before automakers will be satisfied. Among these are the development of a bright finish after anodizing and the application of clad aluminum.

Despite comments, some steelmakers are concerned. It's established that some automakers are seeking bids on aluminum bumpers.



STRESSING STRENGTH: Great Lakes Steel Corp. recently collided two trucks in a bumper strength test. Aluminum bumper is the one on the left.

Adjustable From 1 to 15 Seconds

This new Allen-Bradley development should solve such occasional problems where, upon the operation of the push button or limit switch, a slight time delay should occur. Time delay is adjustable up to 15 seconds—and it can also be introduced when "stopping" the operation—but not in both the "starting" and "stopping" cycle.

Both push-button and limit switch are relatively low in cost—ideal for applications where a delay of only a few seconds is desired, and where the repetitive accuracy of the Allen-Bradley Bulletin 849 time delay relay is not necessary. Both units have single pole, double break contacts—either normally open or normally closed. They are no more difficult to install than the corresponding units without the time delay feature.

Machine tool and production system designers should have full information in their files on these new Allen-Bradley time delay push buttons and limit switches. It is yours for the asking. Write today.

ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1341 S. First St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY MOTOR CONTROL

More Power At Indianapolis?

Owners, Designers Plan New Innovations

The West Coast again sends the lion's share of drivers, cars and engines to Indianapolis next week.

More power, speed and cars at the finishing line are expected. By R. R. Kay

■ The 50th anniversary of the Indianapolis 500-mile auto race could produce some interesting results. Among them: More power, speed, and more cars at the finish line.

Barring serious accidents and bad weather, the winner could average 140 mph—a new record.

And again California sends the lion's share of cars, engines, drivers and mechanics. Most of the 33 cars come from the shops of Frank Kurtis and A. J. Watson. And all but a few of the racers are "Old Reliable," the Meyer & Drake 255-cu in. Offenhauser engine. There are a few refinements on the engine this year, however. And these are expected to add even more power.

Power Steering—This year's race will also introduce power steering on some of the cars. This feature hasn't worked at Indianapolis yet. But if the bugs are out, it could give the drivers an edge—reducing the strain.

Then too, race car designers and builders show greater acceptance this year to several Indianapolis-developed features. More engines will have laid-on-the-side treatment. This keeps added weight on the left side as cars tool 800 left-hand turns.

Popular Jack—Built-in air jacks are more popular. They lift the car off the ground in 0.3 seconds, lower it in 0.7 seconds. This saves much time in the pits, and can mean the difference at the finish line.

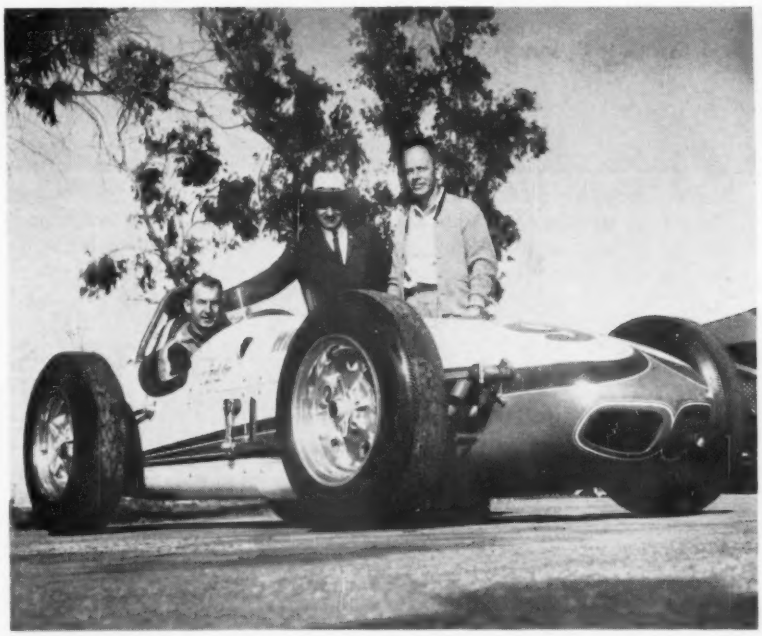
There's also the possibility of top-performance from a couple of rear-engine racers this year. One is the Cooper-Climax, a British-made entry. Its driver: Jack Brabham, world's auto racing champion.

Another is the John Zink Trackburner, first U. S.-made rear-engine car to run at Indianapolis in 12 years. Plans for the Zink car called for a Boeing turbine engine. But it wasn't ready in time. However, it's a good bet that the engine will get a test next year.

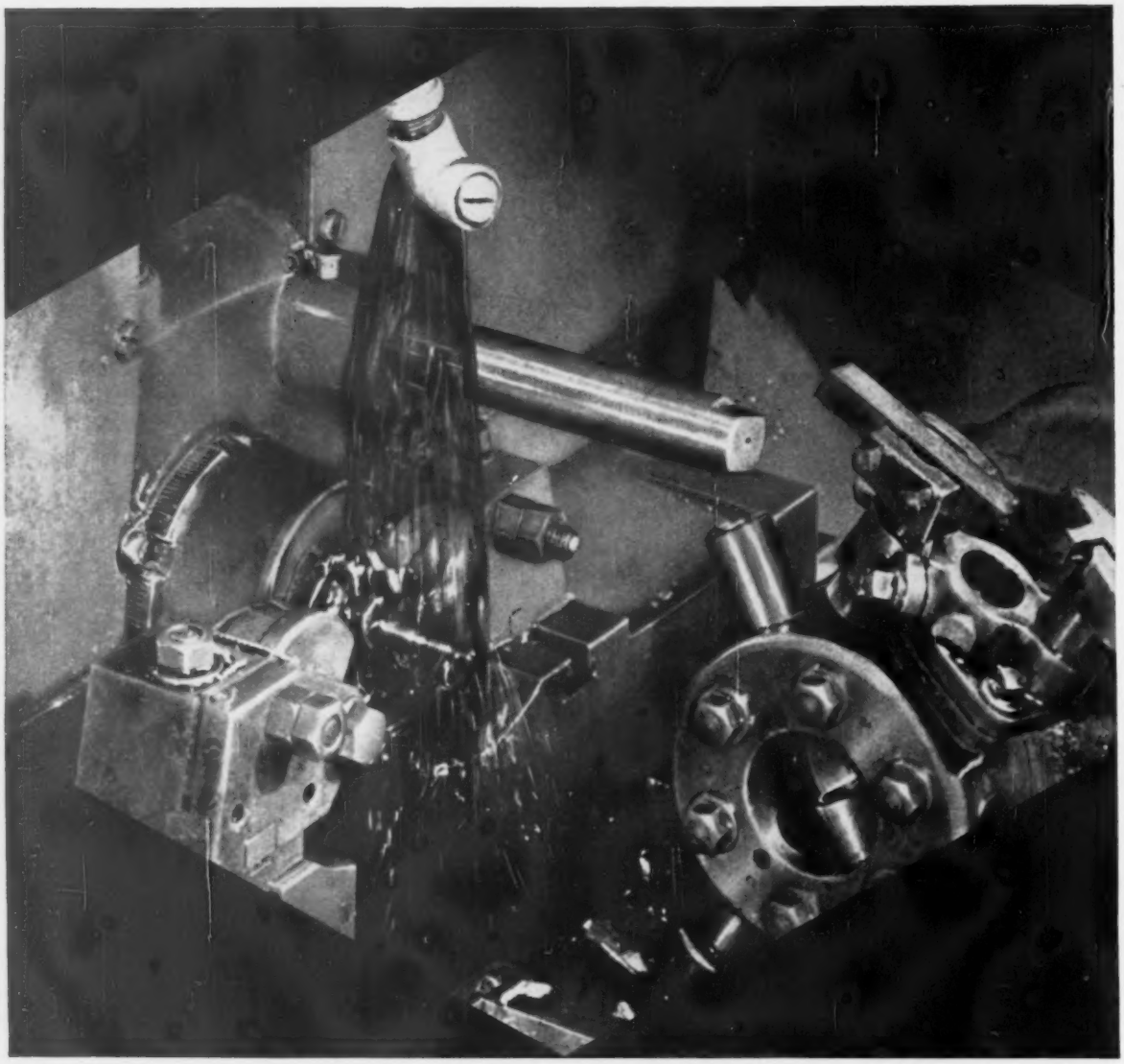
Slow Acceleration—One drawback of the turbine: Slow acceleration. If this problem is overcome, there's a real challenge looming for the Meyer & Drake.

Another strong entry is the Jim Robbins Special. Its designers plan to use an external water-heating unit on the cylinder block sideplate. Just before the race they'll plug the unit in to heat the water to 180 F. This quickly warms the cold metal in the car. It could also mean seconds off the racing time.

Ready for the Qualifying Round



A STARTER?: J. C. Agajanian's Willard Battery Special will be one of the cars trying for a starting spot in the Indianapolis 500-mile race on Memorial Day. Here, Mr. Agajanian (center) looks the car over with driver Parnelli Jones and chief mechanic John Pouelsen.



Replace those black, sulfurized oils! Get cooling, cutting properties you need in a transparent Sunicut cutting oil that lets operators *see* tools, workpieces, finishes and micrometer readings. Sunoco has a wide range of high quality, non-emulsifying Sunicut cutting oils for general-purpose or special-problem operations. They pump easily, wet metal fast, have high film strength, will not stain operators' hands or clothing.

You'll see more than just the job...with Sunicut

SUNOCO

QUALITY...

THE BEST ECONOMY OF ALL

You'll see significant savings, too, when you switch to a transparent Sunicut cutting oil. For you will get the exact *quality* you need for your operation . . . *job-fitted* by men who know what they are doing . . . teamed with *service* you never have to ask for twice.

Let a Sunoco representative get you started with a Sunicut cutting oil now. The dividends in extra performance and savings will prove how right you were in investing in Sunoco quality.

Sun Oil Company, Philadelphia 3, Pennsylvania, Department IA-5. In Canada: Sun Oil Company Limited, Toronto and Montreal.

PIONEERING PETROLEUM PROGRESS FOR 75 YEARS

New Tool Concepts Are Needed

Westinghouse President Urges Restudy of Function

Because of the pressure on American manufacturers, machine tool builders must take a new look at the customer's needs.

At least this is the opinion of Mark Cresap, president, Westinghouse Electric Corp.
By R. H. Eshleman

■ "American industry wants miracles in production—every day. It does not want to replace one obsolete machine tool with another that will be obsolete soon."

This was the opinion expressed by Mark Cresap, president of Westinghouse Electric Corp., at the 25th annual Westinghouse Machine Tool Forum in Pittsburgh, recently.

Mr. Cresap notes that a moderate increase in cutting speed and a 25 pct boost in efficiency just aren't good enough under today's business conditions. This is why Westinghouse finished 1960 with a balance of $5 million previously authorized for machine tool purchases.

New Concepts — The Westinghouse president calls on machine tool builders to discover new concepts resulting in big steps forward for productivity. He says other manufacturers must also act to expand and create domestic markets, regain foreign markets, create jobs and put excess production capacity to work.

Mr. Cresap feels machine designers and application engineers need to restudy their function in giving the manufacturer what he really needs.

"Does he want a quarter-in. drill, or a quarter-in. hole? What is the real and total function of the machine in relation to other machines and to the end product? Should we be proposing an individual piece of equipment, or whole systems? What about installation, repair and maintenance even through replacement and disposal?"

Emphasis Shift—Too often in the past, he points out, emphasis has been on nice features in equipment. No more. Now industry must have creative efficiency engineering to meet competitive challenges.

Already some of this change in emphasis is being felt. For example, there are light-weight design tape controls on grinding machines to give boosts in productivity and improved precision. Miniature logic units and compact electrical controls now give engineers more flexibility.

There is also a trend toward standardization of components. This simplifies the task for process and production engineers in many medium and small-size plants. It customizes production in larger plants.

Foreign Trade—A new idea in foreign trade also came out of the forum. R. L. Jeans of Westinghouse International outlined a plan to export American know-how, especially designed for underdeveloped nations.

The plan: A complete package to build power, steelmills and basic complex for industry to grow on.

With advance technology in these areas, Mr. Jeans predicts vast markets for machine tools; and a stake in the future of many countries for the free enterprise system.

New Trends Take Shape

New trends are shaping up in the machine tool industry. Here are some of the developments to watch for:

1. **Miniaturized logic components** (computer elements) utilized extensively in feedback, proximity in-process gaging and other advanced control devices.
2. **Simplified tape**-controlled machines at lower cost.
3. **Standardization and simplification** of programming and computer language.
4. **Compact, simpler and more reliable** (micromodule type) electrical system and components.
5. **Trend to heavy production grinding,** faster, more precise and more automatic operation through tape control.
6. **Solution to precision and rigidity.** Also, fretting and antifriction rolling problems for slides and spindles through new alloys and materials, new bearing design (as gas lubricated type).
7. **Rapid adoption of new design ideas** and concepts for aerospace and atomic equipment field.
8. **Wider integration of automatic feeding** and unloading in standard as well as special machines.
9. **Greatly expanded research** and development activities.

F. M. Cashin, elected president, Refractories Div., Aluminum & Chemical Corp.

Clark Equipment Co. — **W. E. Schirmer,** elected executive vice president.

Cone Automatic Machine Co., Inc.—**J. A. Kiely,** appointed executive vice president; **R. R. Rhodehamel,** appointed vice president, manufacturing.

Automation Industries, Inc.—**G. J. Posakony,** elected vice president, Research and Magnetics Div., Boulder, Colo.; **D. E. Miller,** elected vice president, Mid-Continent Divs., Tulsa, Okla., and Abilene, Tex.

Electric Autolite Co.—**E. R. Fiene,** appointed vice president and director, sales.

Industrial Electronic Engineers, Inc.—**G. L. Alsobrook,** appointed vice president and treasurer.

Leon J. Barrett Co. — **R. B. Ayres,** elected president and treasurer.

Rolled Steel Corp. — **Stephen Sanders,** appointed vice president, sales.

Scott & Williams, Inc.—**G. H. Miller,** appointed executive vice president.

Standard Forgings Corp.—**R. W. Clansky,** elected chairman of the board; **R. W. Clansky, Jr.,** named president; **A. M. Olson,** elected executive vice president and secretary; **K. E. Cramer,** named treasurer.

U. S. Industries, Inc. — **G. C. Danch,** named vice president, Western Design & Electronics Div.

Standard Tool & Manufacturing Co. — **S. C. Tiensch,** named vice president, manufacturing.

Superior Pneumatic & Manufacturing, Inc.—**W. I. Krewson, Jr.,** appointed president.

R. A. Clayton, elected president, International Div., Aluminum & Chemical Corp.

American Orbitronics Corp.—**Richard Candelaria,** named president.

Alan Wood Steel Co.—**J. A. Senneff,** elected asst. secretary.

Ferro Corp.—**R. E. Bevis,** named corporate vice president.

Colorado Fuel and Iron Corp.—**Fordyce Coburn,** appointed director, purchases.

Fabriform Metal Brazing, Inc.—**A. M. Thompson,** elected president.

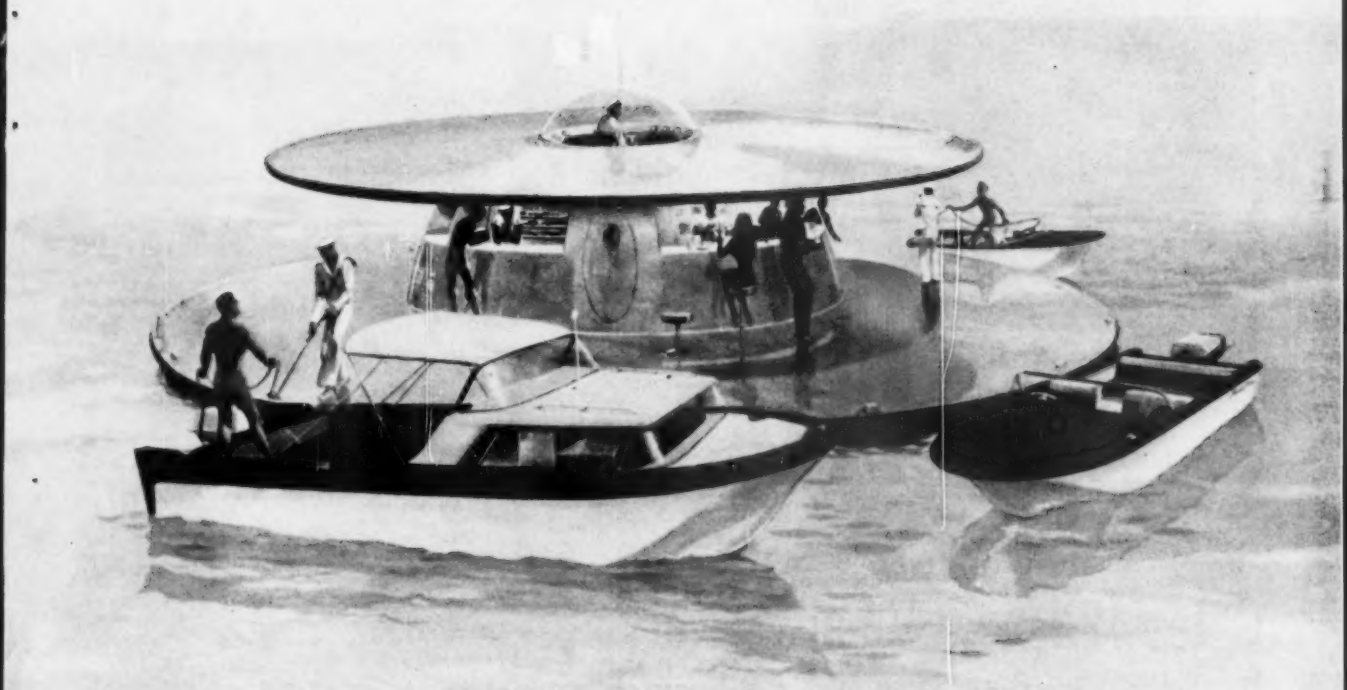
Reynolds Aluminum Service Corp.—**F. L. Sargeant,** elected vice president; **W. B. Moore, Jr.,** named general manager, south central sales region.

(Continued on P. 128)

A. N. Warburton, Jr., elected vice president and controller, Aluminum & Chemical Corp.

E. T. Collinsworth, Jr., elected president and chief administrative officer, Fansteel Metallurgical Corp.

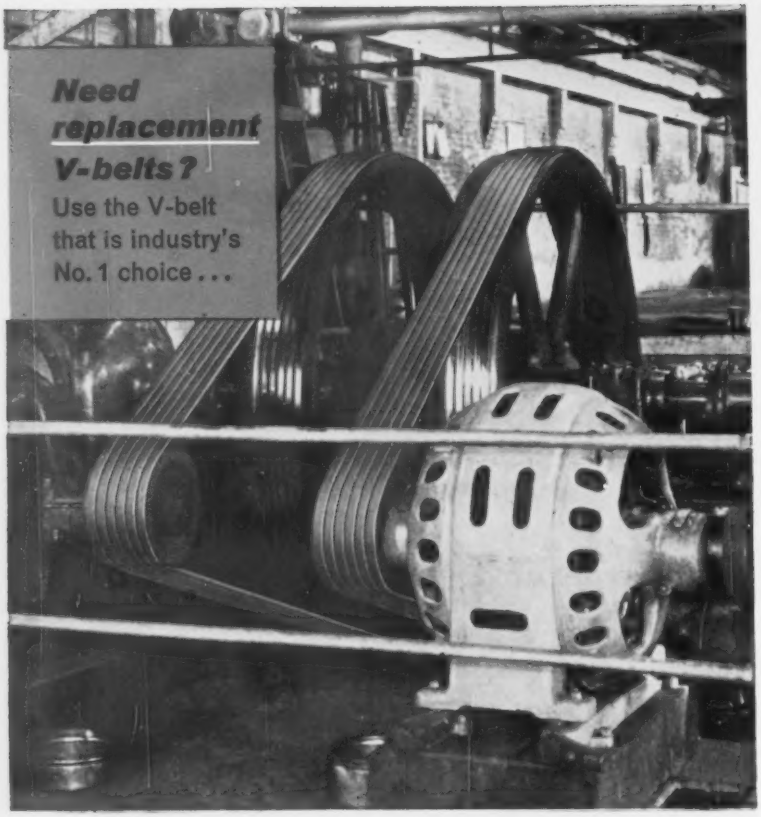
N. H. Schlink, appointed vice president, Divisional Operations, Scovill Mfg. Co.



Aluminum Island.

Is this tomorrow's marina? The boat company that commissioned this Olin design thinks it's very likely. After all, new design and engineering concepts and new fabricating techniques make aluminum near limitless in application. Aluminum's inherent qualities, resistance to corrosion, lightness, natural attractiveness and strength make it a "dream medium" for designers; this marina is an excellent example. It's an on-the-spot depot for fuel, food, marine supplies – and travels from place to place under its own power. And designers who work in new concepts of aluminum have the resources of Olin Aluminum at their disposal. Our technical research and product development staff live in the world of new alloys, intricate design, fabrication, and cost and production statistics. They "think aluminum." All you have to do is think "Olin."®

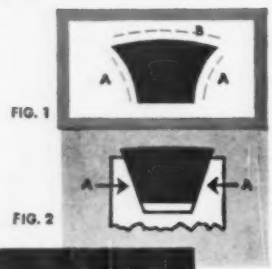
Olin
ALUMINUM
400 PARK AVE., NEW YORK 22, NEW YORK



Gates Hi-Power V-Belts give you longer service life on your drives

Concave sidewalls (U.S. Pat. No. 1813698)—It is easy to see why Gates Hi-Power V-Belts give far longer belt life than ordinary V-belts. *Just make this simple test:* Bend a Gates V-Belt as if it were going around a sheave. Feel how the concave sides (Fig. 1-A) *fill out* . . . become perfectly straight (Fig. 2-A) to make *full contact* with the sides of a sheave. The belt thus grips the sheave evenly, and distributes wear uniformly across the sides of the belt, lengthening belt life.

Precisely-engineered arched top—The arched top (Fig. 1-B) of the Gates Hi-Power V-Belt prevents any distortion of the tensile section cords as the belt bends around the sheave . . . the load is uniformly distributed with each cord carrying its full share.



You will get fast delivery of Hi-Power V-Belts from the local stock of your nearby Gates Distributor. Call him today.

The Gates Rubber Company
Denver, Colorado

BP-8

Gates Hi-Power V-Belts

(Continued from P. 126)

R. C. Trees, named vice president, marketing, Udylite Corp.

David W. Murray Co. — **J. C. Bollerhey,** appointed superintendent, steel mill erection.

Dana Corp.—**V. R. Stump,** appointed general manager.

Interlake Iron Corp. — **R. W. Thompson,** elected chairman of the board; **T. F. Bell,** elected president.

Indiana Cap & Set Screw Co.—**E. J. Flickinger,** elected a member of the board and vice president.

National Lead Co. — **T. P. Mesick,** elected asst. secretary.

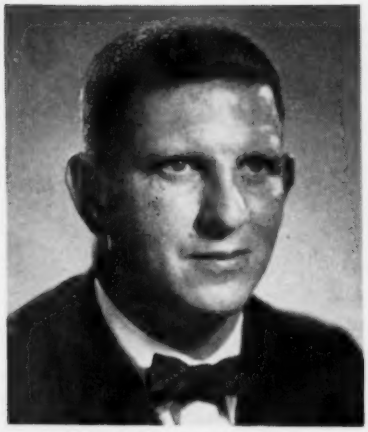
Oglebay Norton Co. — **R. D. Thompson,** appointed executive asst. to the president; **G. F. Kisker,** appointed director of coal sales, Cleveland.

Rockwell-Standard Corp.—**Harry Fante** and **F. W. Parker, Jr.,** elected executive vice presidents.

Strategic Materials Corp.—**W. H. Dalman,** elected treasurer.

Spencer Chemical Co. — **B. F. McAvoy,** appointed asst. to the vice president; **Dr. E. T. Severs,** appointed technical manager, Plastics Div.

Allis - Chalmers Manufacturing Co.—**George Saar,** appointed manager, data processing and systems; **H. C. Nickel,** appointed manager, Nuclear Power Dept., Washington; **J. W. Carlson,** appointed general manager, Engine-Material Handling Div.



A. E. Snyder, elected vice president, Pratt & Whitney Co., Inc.

Vickers Inc. — **D. H. Baker,** elected vice president and general manager, International Div.

Worthington Corp.—**F. R. Ellenberger,** elected vice president, International Operations.

Hathaway Instruments, Inc.—**C. E. Johnson,** elected director.

Mueller Co.—**F. A. Speer,** appointed vice president and works manager.

Industrial Systems Co.—**R. H. Minton,** appointed general sales manager.

Michigan Seamless Tube Co.—**M. F. House,** appointed production manager.

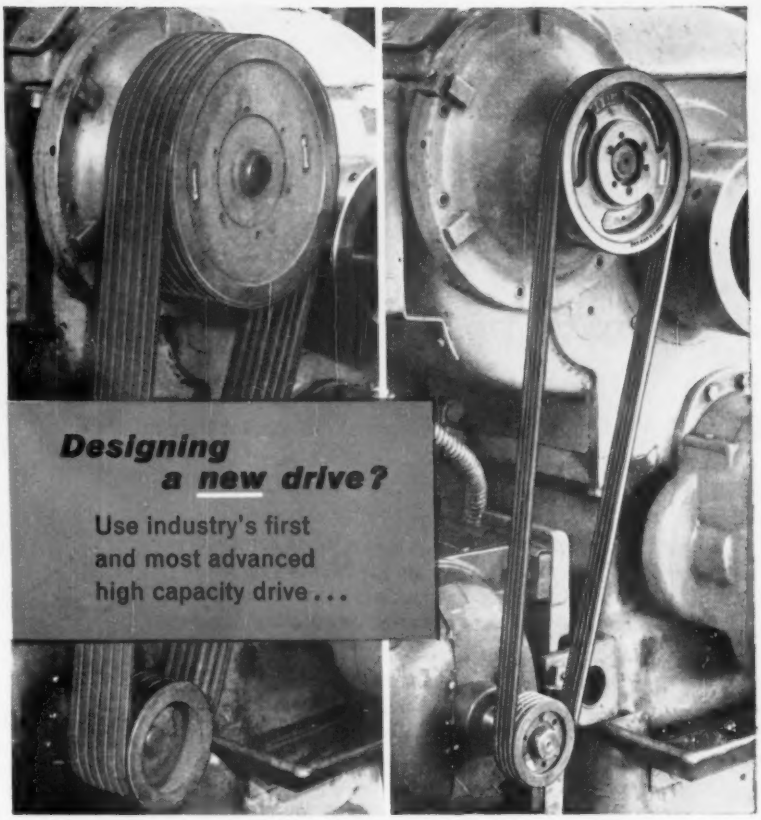
Owatonna Tool Co. — **Arthur Kreager,** appointed district sales manager.

Pettibone Mulliken Corp.—**J. R. Noreen,** appointed manager, purchasing.

Camloc Fastener Corp.—**T. A. Barkauskas,** elected vice president, production; **J. R. Newcomer,** elected vice president, engineering.

Bethlehem Steel Co. — **W. M. Mayberry,** appointed asst. general manager, sales.

Air Reduction Sales Co.—**W. B. Moen,** appointed manager, Cryogenic Engineering Dept., Plainfield, N. J.; **S. S. Bruce, Jr.,** appointed manager, National Railroad Sales Dept., Pittsburgh, Pa.

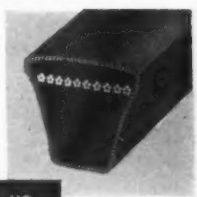


Gates Super High Capacity V-Belts save drive space, weight, money

If you are designing a new drive, or if the belts and sheaves of a conventional V-belt drive must be replaced, you will benefit many ways by installing a Gates Super HC High Capacity V-Belt Drive.

Gates Super HC V-Belt unites new, high performance materials with a basic change in the shape of the belt itself. Because of this, it is able to handle up to 3 times the horsepower of a conventional V-belt in the same space. As a result, Gates Super HC Drives can often cut in half the space required for your drive. Drive costs are cut as much as 20%, and drive weight reduced 20% and more. Guards can be smaller. Bearing loads are less, increasing bearing life. And the drive can operate at belt speeds up to 6000 ft/min without dynamic balancing!

There is a Gates Field Engineer serving your area. To contact him for help in designing a new drive, call your nearby Gates Distributor.



Exclusive design features include: precisely engineered arched top, concave sidewalls, Flex-Weave cover, super strength tensile construction.

Gates

Building the future on 50 years of progress

The Gates Rubber Company
Denver, Colorado

BP-7

Gates Super HC V-Belt Drives

BECAUSE YOUR TEST NEEDS ARE DIFFERENT!

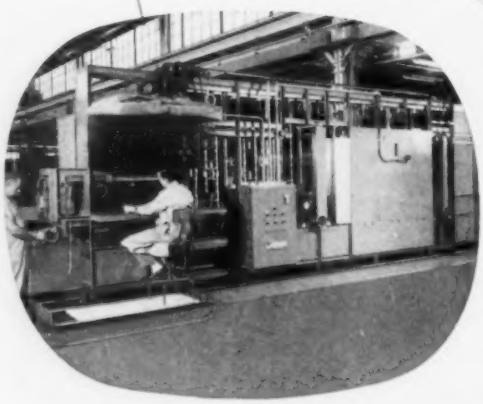
...from MAGNAFLUX you can find many engineered nondestructive test systems*, to meet widely different needs...as near as your telephone.

Only the widest *range* of test systems can assure you of getting the one *best* answer to your own "different" test problem. Several examples of the many ⋈ tests are shown at work on the next page.

The intensive problem-knowledge of the Magnaflux Field Engineer goes to work for you immediately. He qualifies as an impartial, expert counsel because he has thorough training in practically all wide-used nondestructive test systems. (Actually, we offer scores of systems, methods, test services, instruments and custom-engineered units. Magnaflux originated most of 'em and has been improving them ever since.)

Further, he wires you into more nondestructive testing know-how than you're likely to find anywhere else. He's backed, for instance by many hundreds of man-years of experience in field application and of design and project engineering. *Plus* a big department-full of far-reaching research. *Plus* the up to the minute knowledge gained in operating our own fifteen Commercial Testing Centers in principal cities, where the "unusual" tests occur almost daily to meet hundreds of differing needs and specifications.

At Magnaflux you find maximum nondestructive testing assistance—in equipment, men and experience-based understanding of your needs and problems. May we put it all at your service—SOON? Phone your local Magnaflux Field Engineer, or write us. Magnaflux Corporation, 7302 W. Lawrence Avenue, Chicago 31, Illinois.



TESTING BEARING CAGES with ZYGLO fluorescent penetrant. This Zyglo ZA-49, equipped with an endless conveyor, provides mechanized, high volume testing of nonmagnetic parts from ¾" to 10" in diameter. All processing is fully automatic, assuring predetermined control and repeatability of results.

MAGNAFLUX CORPORATION

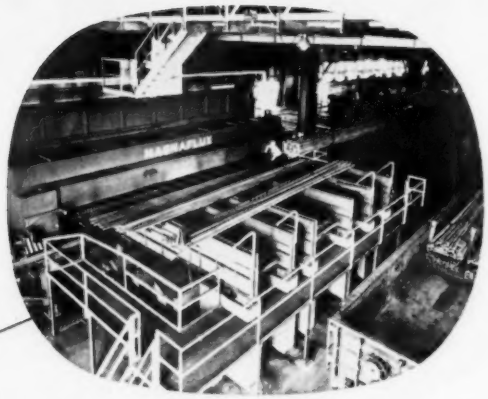
A SUBSIDIARY OF GENERAL MILLS

General Mills

TEST SYSTEMS

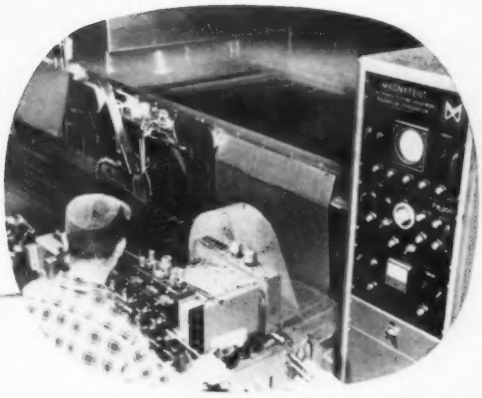
*MX test systems include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, RADIOGRAPHIC TESTING, DYE PENETRANT & MAGNETIC FIELD

A Few of Thousands of ⋈ Test Installations at Work—Could One of Them Help You?



BILLET CONDITIONING SYSTEM

Mechanized, ⋈ engineered inspection and handling provides more control, better quality level, and lower costs from conditioning. MAGNAGLO, electronic eddy current, ZYGLO fluorescent penetrant testing, for billets, tube rounds, welded and seamless tubing and pipe.



TESTING COPPER TUBING ELECTRONICALLY

with MAGNATEST FW-400, for cracks and seams at production speeds. Many kinds of MAGNATEST instruments, hundreds of applications: determining metal properties, defects, characteristics, sorting, etc.

TESTING THICKNESS ULTRASONICALLY

for core shift of castings, or almost any solid material, from .025″ to 3.00″, for thickness, corrosion, etc., from one side only. Portable transistorized SONIZON SO-300 gives instant dial readings, accurate to ±1%. Magnaflux Field Engineer instructs in operation (above).

TESTING JET ENGINE

turbine wheels electronically for serration cracks, with MAGNATEST ED-500G, eddy current instrument. Magnatest units measure relative depth of cracks, electrical conductivity, evaluate metals for all sorts of basic or process-built characteristics.

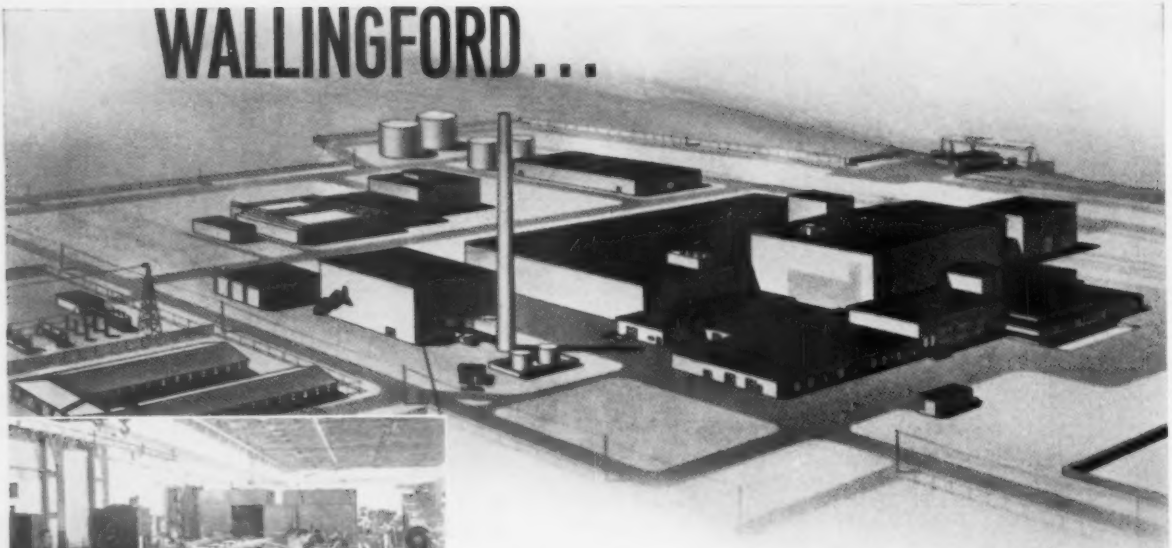
RADIOGRAPHIC TESTING

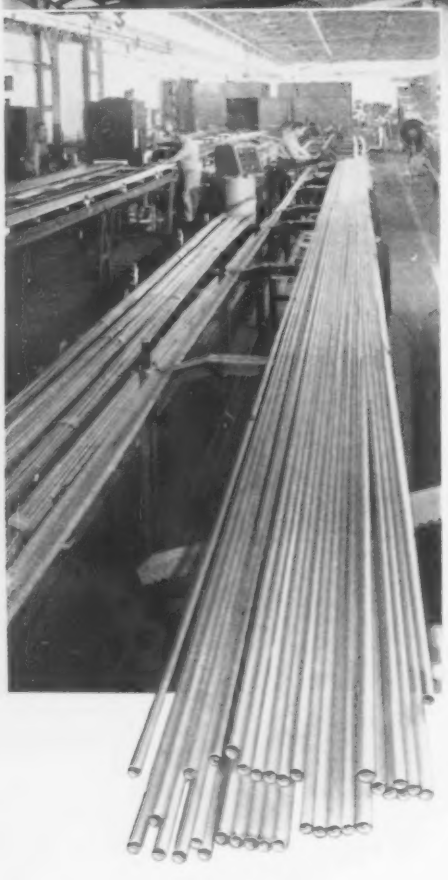
of boiler tubes with gamma radiation isotope. X-ray and gamma radiography service available at several locations. Performed by certified technicians and engineers at your plant or at your local ⋈ Commercial Testing Center.

©1960, Magnaflux Corporation

MAGNAFLUX, MAGNAGLO, ZYGLO, ZYGLO-PENTREX, BONDCHECK, MAGNATEST, SONIZON, STRESSCOAT AND SPOTCHECK ARE U.S. REGISTERED TRADEMARKS OF MAGNAFLUX CORPORATION

WALLINGFORD...





PRODUCES
1,000,000 FLAWLESS FEET
TO TRAP ENERGY-GENERATING HEAT

... an energy conversion system made as it must be with

WALLINGFORD

Stainless Steel

At the Atomic Energy Commission's Hanford Works plutonium-making plant, Richland, Washington, one million feet of welded stainless steel tubing will perform a tremendous money-saving function under critical radioactive conditions . . . by helping ten steam generating units built by Combustion Engineering to trap energy-generating heat otherwise destined to be wasted.

The Wallingford Steel Company produced the miles of reliable, corrosion resistant, high quality tubing needed on this specific heat conversion job!

To meet rigid Atomic Energy Commission specifications, the tubing had to satisfy uncommonly strict demands for ideal physical and metallurgical properties . . . for an ability to withstand extreme pressures . . . for exceptional tensile and yield strengths . . . and for flare and bend qualities.

Exclusive Wallingford fabricating and testing techniques ensured the tubing's total perfection. These same techniques are what makes Wallingford stainless advantageously different.

Ask our customers "Why Wallingford?" And ask us for specific recommendations on your need for stainless steel tubing or strip.

Progress in Metals Since 1922

THE WALLINGFORD STEEL CO.

TONNAGE *on a Laboratory Basis*

WALLINGFORD, CONNECTICUT, U.S.A.

Keep Titan Bearings Warm

Supplying heat to a bearing in the liquid-oxygen pump gear drive in the Titan missile is a specially designed heater. Heat is needed due to the extreme cold of the liquid oxygen. The heaters use 0.085-in. diam, Type 304 stainless tubing to sheath resistance wires. Precision formed to fit into machined grooves in the bearing sleeves, the heaters operate in ambient temperatures from –300° to 750°F.

Push "Dogleg" and "Saint"

The Military is pushing satellite-killer programs. Pentagon officials say some anti-satellite missiles could be ready in a year and a half. Programs underway include the Navy's "Dogleg" and "Notsnik", and the Air Force "Saint."

Electronics Sales Spiral

Radical new uses of electronics range from communications satellites to controls that automatically monitor and regulate industrial production. They will continue to spur the electronics industry, says G. L. Haller, a GE vice president. Sales in four major categories jumped 350 pct between 1950 and 1960, notes Dr. Haller. He predicts that sales in just one of these markets, military, will be $10.5 billion in 1970—as large as the entire industry today.

Clears Hydraulic Lines

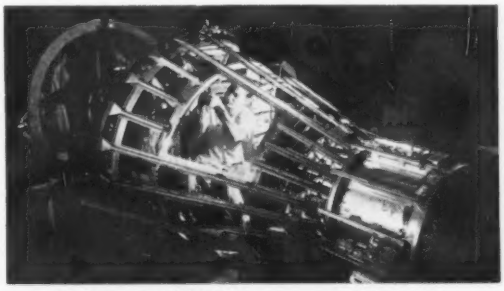
In the past, one of the big reasons for missile failures was traced to contamination in the hydraulic lines. Convair/Pomona has now developed a new way to rid these lines of damaging foreign particles. The process is dynamic honing. The technique is fast. Internal surfaces are free from scratches and pits.

Hike Space Budget

President Kennedy is following up the U.S. first manned space flight with a "larger effort" in the space field. Sources say the "effort" will mean about a $600 million boost for the U.S. space program. The President is expected to recommend to Congress a $500 million increase for NASA and a $100 million hike for Defense Dept. space projects—moving the civilian space budget closer and closer to the $2 billion mark. Any increases are expected to be just the beginning of an extended enlargement of the U. S. space effort. This, of course, will also mean additional money to be spent with aerospace industries.

Behind the Space Flight

Space capsule, similar to one that launched the first U.S. astronaut, is readied for future flight. Materials that played a vital role in the space flight include: Titanium for capsule, antenna, parachute housings, and adapter section; ceramic fibers for thermal insulation, René 41 shingles to shroud the capsule, beryllium for the heat shield; aluminum and magnesium for various cast sections.



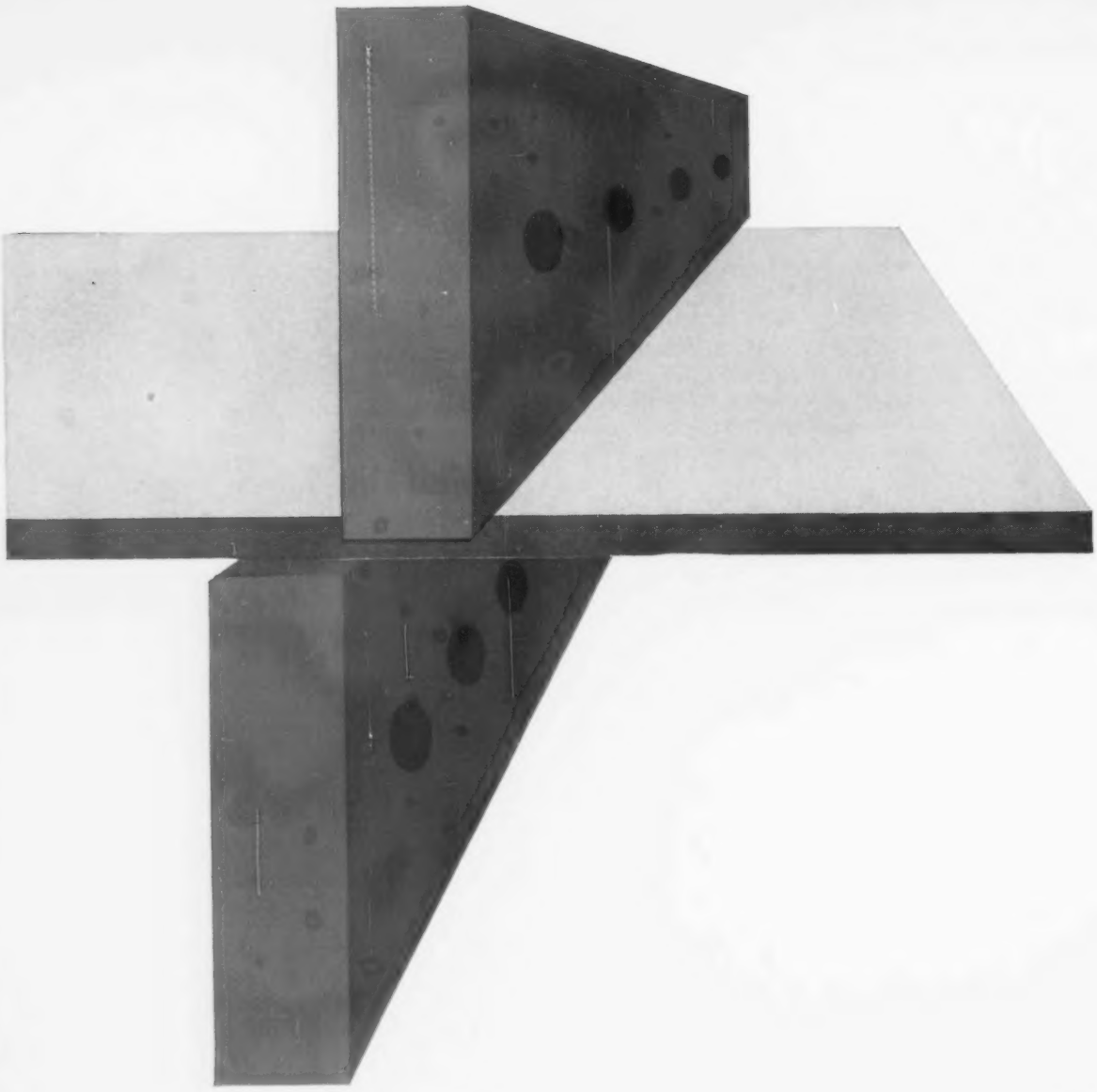
SPACE CAPSULE: A materials team.

Where the Money's Going

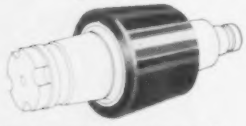
The Defense Department's financial plan for fiscal year 1962 shows an increase in net expenditures over 1961. Overall, the 1962 expenditures will be $43.8 billion as compared to $42.5 billion for 1961. Some major expenditures (in millions of dollars) are:

	1961	1962
Equipment & Missiles—Army	1,483.4	1,746
Aircraft & Missiles—Navy	254.1	1,085.4
Aircraft Procurement—AF	2,906.7	3,782.1
Airlift Modernization—AF	30	175.6
Missile Procurement—AF	2,574.2	2,979

Research, development, test and evaluation in 1962 will amount to $4,576.1 million as compared to $3,908.1 million in 1961.



Heppenstall rolls it, cuts it, handles it



Back-up roll sleeves and rolls

Side trimmer knives

Motorized sheet lifter

In the steelmaking industry — from melt shop to finished product — Heppenstall back-up roll sleeves and rolls, knives and tongs are proving their high performance value. To maintain such standards, Heppenstall has modern laboratories in each product division. All products are constantly checked — and intensive research is carried on to improve present products and to develop new ones. Heppenstall Representatives are fully experienced in the selection and application of our products to meet your problems. For service or specific information, call our nearest Representative or write us direct.

HEPPENSTALL COMPANY
PITTSBURGH 1, PA.
Plants: Pittsburgh & New Brighton, Pa. • Bridgeport, Conn.

MIDVALE-HEPPENSTALL COMPANY
NICETOWN, PHILADELPHIA 40, PA.

H M H

Vibratory Finishing the Key To Smoother Surfaces

By **W. E. Brandt**—Vice President, Pangborn Corp., Hagerstown, Md.

Another step has been taken to remove the element of risk from jet engine performance.

The development of a new vibratory finishing machine holds airfoil parts at their proper tolerance.

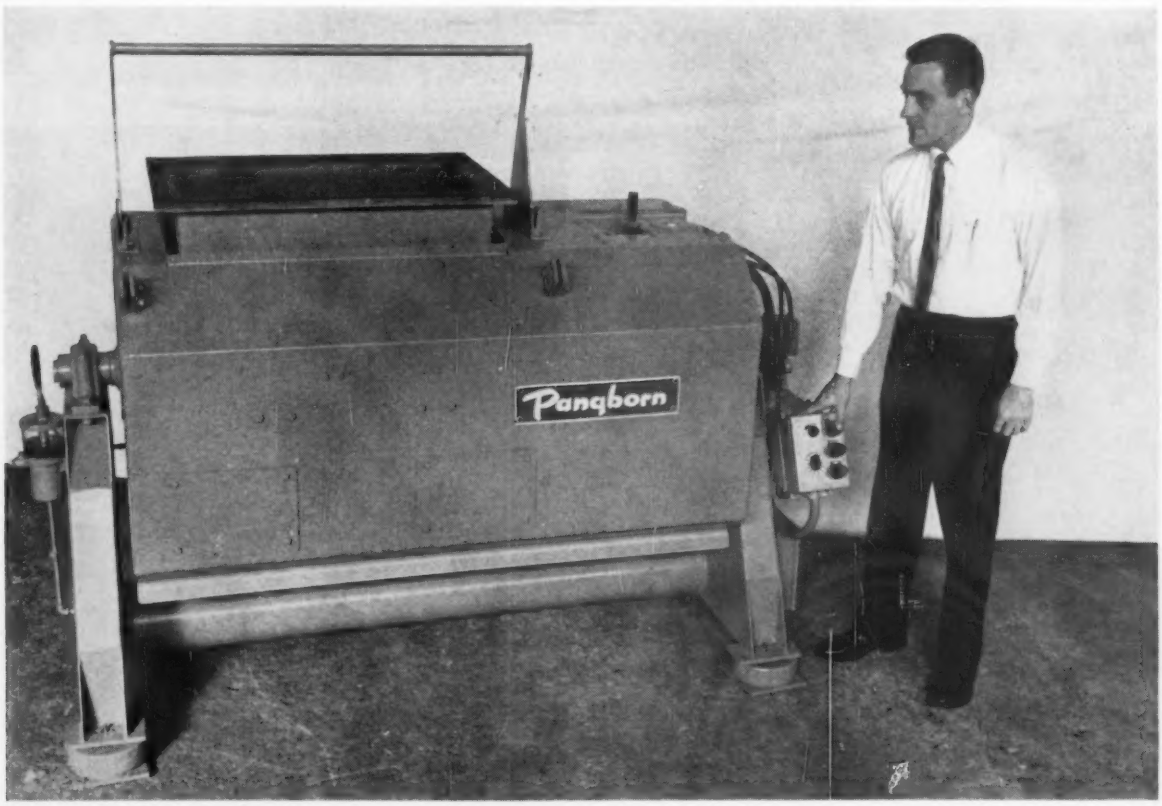
■ Turbines and compressors work better and last longer when their airfoil parts have smooth, uniform surface finishes. For this reason, such parts as blades, buckets and vanes must meet rigid specifications for surface smoothness and contour.

This surface must be achieved without changing the critical dimensions of the piece. Any miscalculation here results in change in the aerodynamic contour.

Methods used to obtain such finishes include grinding, tumbling, honing and buffing. Each of these methods presents a number of drawbacks and problems, though. They're all tedious, lengthy, sometimes wasteful and they require much skilled labor.

Why Compromise?—Present-day specs governing airfoil production are really a compromise between an ultra-smooth surface finish and the expense needed to achieve this finish.

With vibratory finishing, however, the compromise is no longer valid. This fairly new process offers three



READY FOR ACTION: All but the largest airfoil pieces can be finished successfully in the 10-hp, 6-cu ft vibratory-finishing machine. This machine polishes airfoil parts to very tight tolerances.

main rewards. Included are savings in time and labor costs, greater uniformity of finish and smoother surface.

At Pangborn Corp.'s research and development lab in Hagerstown, Md., we've been evaluating this system for nearly a year. The vibratory process has been put to work finishing many types of airfoils used in steam or gas turbines and jet engines. Our results show huge cost reductions in finishing these parts.

Quick and Smooth—In one test, jet turbine blades were finished 21 times faster by the vibratory process than by precision barrel tumbling. Also, the surface finish obtained was more than 40 microinches smoother than that obtained by tumbling.

A number of leading turbine builders have already replaced their existing systems with vibratory setups. One company has embarked on a crash program to study the increased performance of jet engines that are equipped with vibratory-finished parts. And the parts include everything from inlet guide vanes to turbine buckets.

Too Costly — Can't power tool machines match the vibratory system in quality? They can but only at great cost. So much time must be spent on each piece. Even then, you're never too sure that you've removed a uniform amount of stock.

Parts can now be barrel finished faster and cheaper in the vibrator. At the same time, there's little risk of rejects due to nicking, scratching or removal.

Prior to surface finishing, most airfoils measure anywhere from 100 to 350 rms. The shaping process, be it casting, forging or machining, governs the rms value. The role of finishing then is to reduce the smoothness value to the specified level. Raw castings that measured about 350 rms have been finished to less than 32 rms.

Actual Results—Several stages of jet engine compressor blades, precision forged to about 100 rms, were vibratory finished to a smoothness of less than 16 rms. Forging lines and pits were removed, too. And the leading edges showed complete blend of radius. No pieces were rejected either.

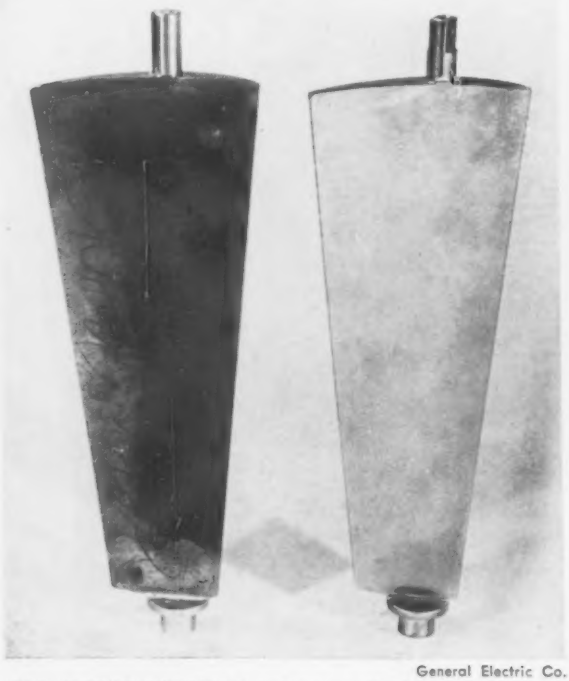
The vibrator then took on another set of forged blades. Without any change to the aerodynamic shape, this set was finished to a 2-3 rms range.

You reap two benefits from ultra-smooth airfoils. Efficiency increases and blade life is extended. What happens is that the friction over the blade surface decreases. There's then less chance for in-flight failure of a blade due to metal fatigue.

With the tumbling process, close control of stock removal isn't easy. It's even tougher with power tool methods. The vibratory process, however, can exert close controls.

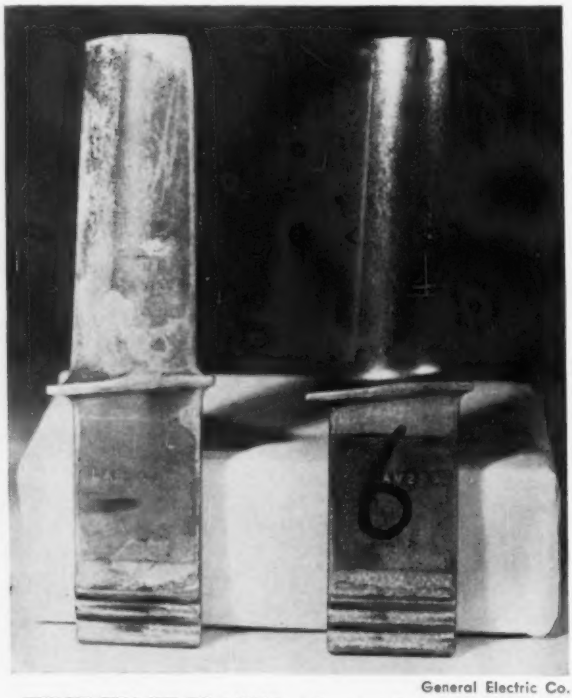
Same Old Contour — Unlike grinding and machining, stock removal by the vibratory method doesn't change the aerodynamic contour of the airfoil. Stock, you see, is removed at a uniform rate from all exposed surfaces of the piece. Areas requiring less stock removal than others can be shielded.

At Pangborn, airfoils with areas to be shielded are attached to a heavy steel fixture. Steel projections



General Electric Co.

BIG IMPROVEMENT: Prior to polishing, guide vane (left) is 63 rms. After two-hour vibration it's 4 rms.



General Electric Co.

FIRST-STAGE BLADES: After two hours in vibrator, turbine blade at right boasts 4-6 rms finish.

welded to the fixture provide the actual shielding. The fixture is mounted to the rim of the vibrating work container.

The time cycle required to finish fixtured pieces to a given smoothness is about 75 pct less than that needed to vibrate the same pieces loosely in batches. Large, heavy pieces should be fixtured to prevent nicking.

No Stresses — Machine-finished blades are often heat treated to relieve machine-induced stresses in the metal. The vibratory process does not induce stresses. It actually relieves stresses induced by other finishing steps.

The vibratory process greatly reduces or eliminates completely the amount of machining required to finish certain airfoil parts. As a result, heat-treat stress relieving can also be reduced or bypassed altogether.

Test results from a jet engine manufacturer on a batch of compressor blades are favorable. There were no harmful effects in the metallurgy. Hardness stayed the same. Magnetic particle tests didn't reveal any stress-corrosion cracks. The end result was that all parts were well within the required spec.

Ready For Inspection — Vibratory-finished airfoils do not require buffing or polishing. They may be subjected to Zyglo or Magnaflux inspection without further processing because pieces are chemically clean when removed from the vibrator.

Present work at Pangborn is carried out in 6- and 18-cu ft capacity air-cushioned machines. Precise records are kept to make it easier for the customer to achieve like results in its own plant. Data include frequency, amplitude, sizes, types and amounts of media and compounds, and time cycles.

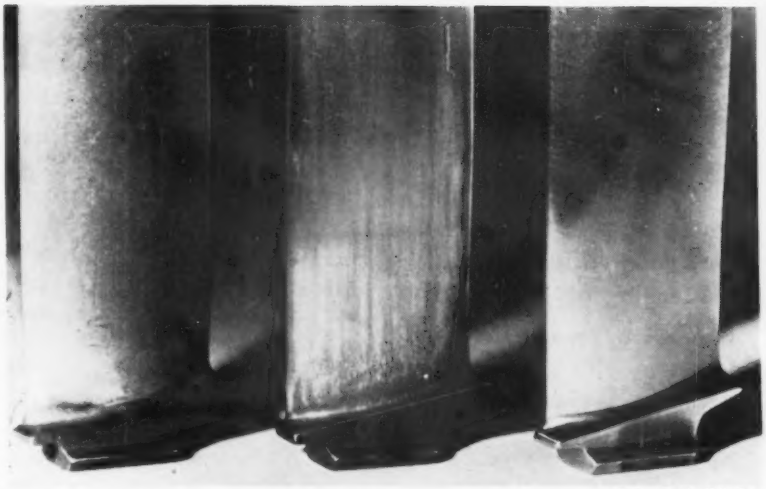
Armed with these data, the customer can set up each parameter much the same as he would with any machine. As such, he can repeat the operation with identical results.

Simple Formula—Vibratory finishing is normally a batch-type operation. How long does it take to process one piece? You can get this answer by dividing the time cycle by the number of pieces in the load.

A production load of 100 pieces, for example, can be turned out to a given surface finish in the same time it takes to finish a test sample of 10 pieces.

Production cost analyses, therefore, should be computed from the production load basis, not from an experimental basis.

Hand machining and barrel finishing of airfoil parts both depend upon a certain amount of guesswork. The vibratory process has taken great strides to remove this gray area of guesswork from these vital finishing cycles.



General Electric Co.

INITIAL FINISH: As-received blade (left) has 16 rms finish. Sanding (center) exposes surface pits. Vibratory finish (right) is pit-free.

Compare Airfoil Finishes

Blade	Time, hours	Average Profilometer Readings, rms: Before finishing	After finishing
TUMBLED LOOSE			
A	16	143	74
B	16	88	62
C	16	137	64
D	16	89	47
VIBRATED LOOSE			
E	1	78	15
F	½	76	27
G	1½	74	10
H	2	135	19
VIBRATED ON FIXTURE			
I	2/3	97	6
J	2/3	116	7
K	2/3	90	8
L	2/3	93	8

Reprints of this article are available as long as the supply lasts Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Ask for Reprint **No. 170**

Stainless Steels Gain Strength

Ultra-Cold Forming Methods Boost Tensile and Hardness Values

Cold rolling at subzero temperatures alters the properties of austenitic stainless alloys.

Explosive forming in ultra-cold setups also increases the strength and hardness levels.

■ Austenitic stainless steels are well-known for their corrosion resistance and good strength at both high and low temperatures. Since these steels have a face-centered cubic structure at low temperatures, they can't be hardened by rapid cooling. Instead, they're normally cold worked at room temperatures.

However, these austenitic alloys can be made even stronger if they're cold rolled in subzero environments. As you lower the working temperature, the tensile strength of a given alloy increases rapidly.

Many Advantages — Of course, you can't get something for nothing: Elongation drops as the rolling temperature dips. But a strip can be rolled to a fixed strength level. In the latter case, the lower the rolling temperature, the greater the elongation.

The ductility of cold-worked austenitic stainless is also greater at subzero temperatures than at room or elevated temperature levels. This means you can get smoother, crack-free bends in an ultra-cold environment.

Aging at heats up to 800°F, after subzero rolling, increases the tensile strength to even higher levels. The International Nickel Co. reports the optimum follow-up aging treatment is 100 hours at about 800°F.

Over 300,000 psi — The effects of aging become more noticeable with the addition of columbium or aluminum or both. Without these additions, aging increases the strength of an 18-pct Cr — 9.5 pct Ni stainless steel from 184,000 to 253,000 psi. Adding either 1.13 pct Cb or 0.83 pct Al boosts the tensile strength from 193,000 to about 300,000 psi.

Subzero-rolled (zerolled) and aged stainless steels retain from 70-75 pct of their room-temperature strength at heats up to 800°F. This percentage figure is about the same as the strength retention for annealed or room-temperature cold-worked Type 300 stainless steels. It's also on a par with the strength retention of precipitation-hardening stainless.

Nickel also has a profound effect on the strength of austenitic stainless alloys. Let's see how nickel affects zerolled and aged Type 347 stainless.

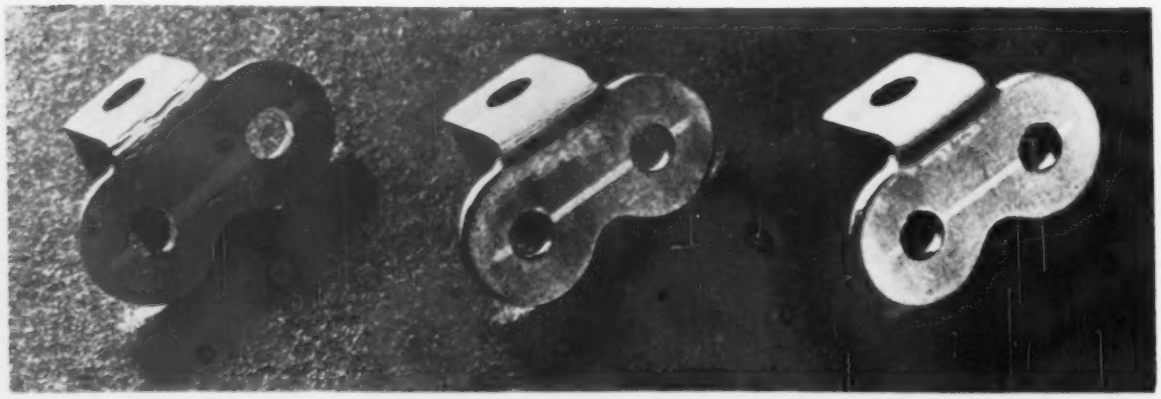
Too Much Nickel?—With nickel content at 9.4 and 12.5 pct in two similar Type 347 alloys, both have a tensile strength of 147,000 psi after being rolled 40 pct at room temperature. Results are quite different when these alloys are zerolled and aged.

If both alloys are rolled the same amount at −105°F, the less-stable 9.4 pct Ni alloy becomes noticeably stronger. Its tensile strength climbs to 184,000 psi. The more-stable alloy, on the other hand, is rated at 164,000 psi.

Aging after zerolling really alters the strength picture. The low-nickel alloy gains a tensile strength of 303,000 psi. And the 12.5 pct Ni alloy reaches a strength level of 221,000 psi. See chart on p. 140.

Phase Change—These strength differences aren't caused by the variations in nickel content, per se. Instead, they hinge on nickel's effect on the alloy's stability.

In the less-stable alloy, more



ULTRA-COLD BEND: Sample on left was bent at 775°-800°F. Note the cracks on the formed edge. The middle sample was bent at room temperature. Sample at right was bent 90° at the temperature of dry ice.

transformation from gamma to alpha phase occurs during zerolling than in the 12.5 pct Ni composition. This greater transformation strengthens the alloy. It also permits additional strengthening to take place during aging.

With even greater reductions at subzero temperatures, you can get even higher strengths. A case in point centers on a Type 347 stainless steel which contains 18 pct Cr, 10.6 pct Ni and 0.78 pct Cb.

After zerolling to 40 pct and aging, this alloy boasts a tensile strength of 250,000 psi. With 70 pct reduction at –105°F, plus aging at 800°F, the strength increases to 320,000 psi.

Alternate Method — To obtain maximum strength, it isn't necessary to do all the rolling at subzero temperatures.

Rolling a Type 304 stainless 80 pct at –320°F, followed by aging at 800°F, gives a tensile strength of 352,000 psi. This figure is much higher than the 225,000 psi that's obtained by rolling the same alloy 90 pct at room temperatures.

However, the same top strength (352,000 psi) can be obtained in an easier manner. First, the alloy is rolled 40 pct at 400°F. Then it's rolled to another 40 pct reduction at –320°F.

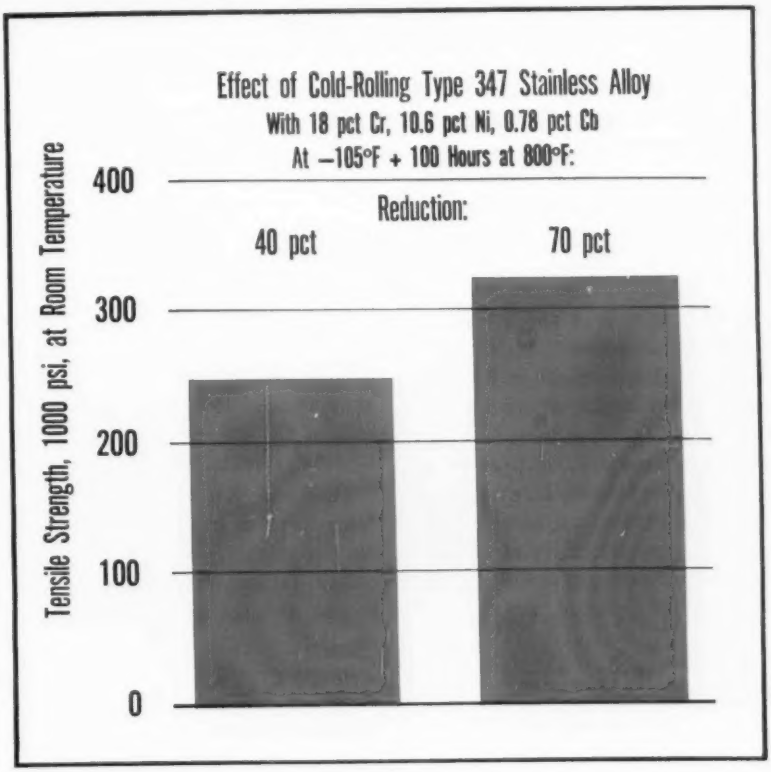
Hot and Cold—At 400°F, the work hardening rate for Type 304 is less than at room temperature. This is because there's no gamma to alpha transformation. Thus, rolling at 400°F increases the strength only by work hardening the austenite.

Additional rolling at –320°F further work hardens the matrix. At the same time zerolling causes transformation from gamma to alpha phase. This amount of transformation is about the same as when all the rolling is done at –320°F.

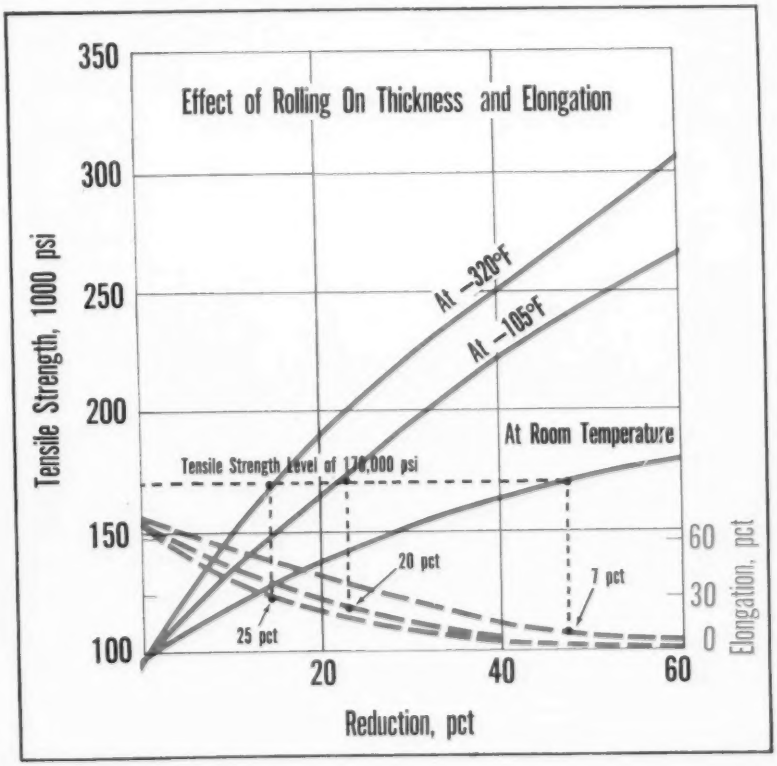
Of course, the high strengths obtained by cold rolling any metal are limited by the metal's thickness. It's hard to work the center portion of heavy-gage strip.

Shock Waves—Explosive shock

Follow-up Aging Is Important



Note Tensile-Elongation Data



waves also serve as a hardening medium. Type 304 test samples have been subjected to shock loadings at Stanford University. Each sample measured 3 x 6 x 9 in.

When the explosive was used at room temperature, the tensile strength went from 81,000 to 120,000 psi. Actually, only the top of the sample's surface gained full advantage of the blast. Below the surface, the sample's strength was 112,000 psi.

The same type of shock loading, carried out at –200°F, boosted another sample's strength to 153,700 psi. At a distance of ½-2½ in. from the surface, this sample's strength became 142,700 psi.

These shock loads didn't change the shape of the test sample. At both temperatures, there was transformation from gamma to alpha phase. The greater amount of transformation took place at –200°F.

Going Up—An important metallurgist reports: "We are sure much higher strengths can be achieved. The key to even higher strengths centers on less-stable austenitic stainless steels. Adding columbium and/or aluminum to these steels, then aging after shock loading at subzero temperatures would produce ultrahigh-strength levels."

Where can subzero-hardened stainless steels be obtained? None of these specially-made metals are commercially available. All of the data in this article has been gleaned from lab reports.

How can you form useful parts from these materials, once they're on the market? If fabrication involves fusion welding, the weld proper and the heat-affected zone will have properties similar to the parent alloy in the annealed condition.

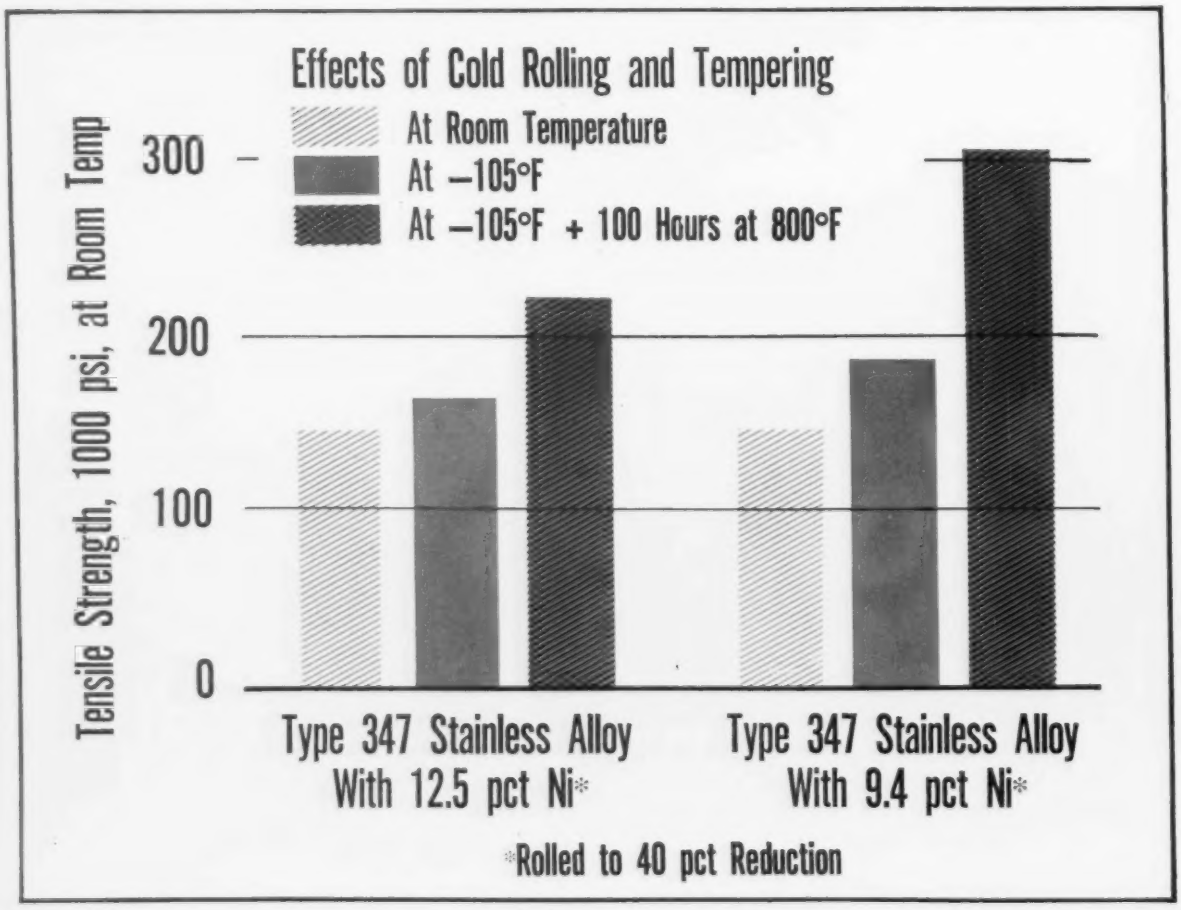
Blast to Harden — As regards plate, it's reasonable to assume that after welding, a part could be hardened by explosive methods.

If the plate is thin, it can be obtained in cold rolled tempers, such as ¼ or ½ hard.

Next, let's check out sheet gages. One company has made thin-walled test vessels 4 ft long and 12.5 in. in diameter. The 0.06-in. walls on these vessels were joined by welding annealed stainless into 11-in. diam vessels.

After welding, each vessel was filled with liquid nitrogen. As the vessels exploded to size, the tensile strength rose to 260,000 psi or better. Maximum variation in diameter was held to 0.015 in.

How Nickel Affects Subzero-Rolled Strength


Effects of Cold Rolling and Tempering
At Room Temperature
At –105°F
At –105°F + 100 Hours at 800°F
Tensile Strength, 1000 psi, at Room Temp
300
200
100
0
Type 347 Stainless Alloy With 12.5 pct Ni*
Type 347 Stainless Alloy With 9.4 pct Ni*
*Rolled to 40 pct Reduction

Electro-Spray Paints Odd Sizes

Speed and versatility highlight a newly-installed electrostatic paint-spray system.

Part size or shape pose no problem to the line as the reciprocating bells apply uniform coatings.

■ Kelvinator's modern refrigerator finishing line in the Grand Rapids, Michigan plant is the first of its kind. The line employs a series of reciprocating Electro - Spray bell atomizers.

Flexibility is the byword as the line accommodates mixed sizes of cabinets and doors at the same time. Ransburg Electro-Coating Corp.'s, Indianapolis, engineers developed the moving bell setup with automatic controls for triggering and repositioning to provide this flexibility. Thus many different part shapes and sizes can be painted automatically on the one line.

Quick Changeover—The Ransburg automatic setup replaced a battery of automatic air guns, supplemented by hand spray. The three-week changeover period involved major remodeling.

Five water-wash spray booths were removed, and a new ventilating system was installed. This, along with a longer conveyor and a newly-designed indexing system was enclosed in a pressurized room. The floor conveyor carries the 56-in. work holders at speeds from 12-24 fpm.

Paint is circulated from the mix building into a 55-gallon drum in the paint room. A separate system takes it from the drum, through heaters, filters and into the electrostatic units.

Pre-Paint Cleanup—From fabrication, refrigerator cabinet shells and doors are hung on an overhead line for cleaning. The work goes through a six-stage Bonderizer. The process includes a cleaner; hot rinse (140°-150°F); cold rinse; Bonderite at 160°F; cold rinse; and a deionized rinse.

The work is transferred from the overhead line to the 1260-ft floor conveyor for painting, with cabinets positioned right side up.

Sides of the cabinet shells and doors are painted at the first electrostatic station. Here, there are four reciprocating units, two on each side of the line.

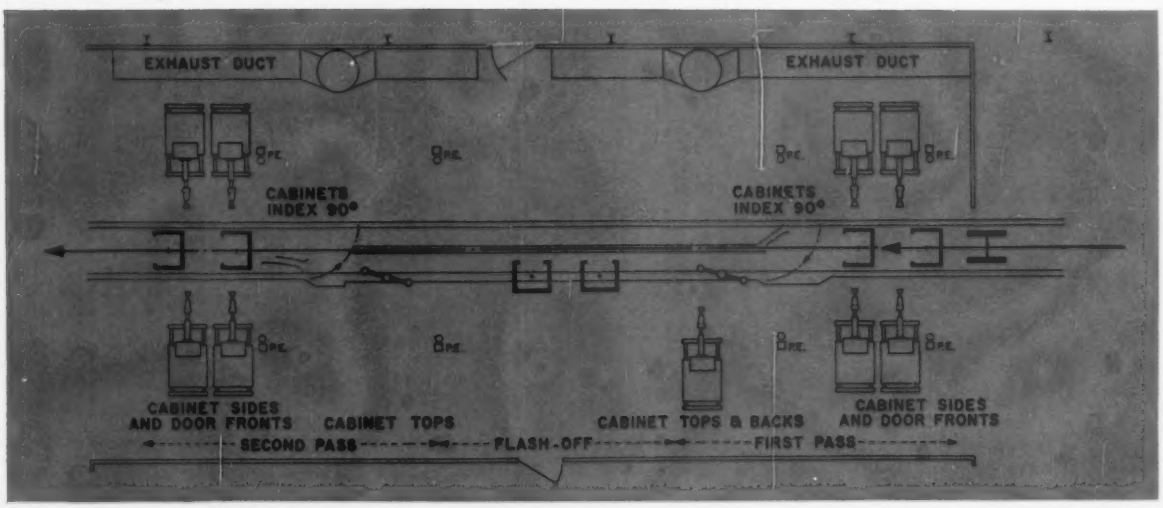
Each unit consists of three atomizing bells mounted in a vertical line, one above the other. The 4-in. bells, rotating at 900 rpm, move up and down in a short stroke while applying the uniform coating electrostatically.

As the various sized parts move in front of the painting units, the bells—controlled by limit switches—move automatically back and forth from the work. This action maintains the proper painting distance, which in this instance is about 13 in. Electric eyes trigger the on-and-off spray cycles.

Positions Work—As parts move up the line to the second and third stations, they're indexed 90° to catch locallized areas. Cabinet shells and doors then move into a gas fired oven and bake out at 350°F for 30 minutes.

The automatic paint system has virtually eliminated rejections. The reciprocating bells apply a uniform coating, yet there is no overspray. Thus, Kelvinator reports substantial paint savings on the operation.

Conveyor Tilts Part for Even Coating



Step-by-Step Controls Pay Off In Machining Hi-Temp Alloys

An experienced job shop reports: "There's no substitute for experience in machining hard, heat-resistant alloys."

For success on these tough jobs, you've got to maintain tight quality controls.

■ Machining small-lot parts from hard, heat-resistant alloys calls for special methods and tight quality controls. Care must be the byword from initial-planning stages to final inspection.

For success in handling these tough jobs, there's no substitute for experience. Know how and tight controls pay off at the Hercules Aircraft Industries, Inc., Detroit.

This company makes prototype blades, wheels and compressor rotors for gas turbines and missile engines. Alloys used for this close-tolerance work run the gamut of hard-to-machine metals.

Complications — These tough metals include: Stainless-steel and titanium alloys; Inconel; and hot-work die steels such as Udimet 500, Vascojet, Mimonic, Waspaloy and Hastelloy.

Generally, the hardness of these metals ranges from 40-48 Rc. However, parts with a hardness of 90 Rc have been machined at the Detroit plant. With these tough metals, work hardening is an ever-present problem. Tolerances create other bottlenecks. Limits as fine as 0.0002 in. must be held.

Another complication centers on design. Many parts vary in thickness and taper. Some blades that are 6 in. long require a tip thickness of only 0.016 in. Other blades taper down to a mere 0.006 in.

Plan Ahead—Such paper-thin sections are hard to machine. They tend to distort quite readily. This distortion problem can't be ignored.

What's the first step in handling these prototype parts? At Hercules, a production engineer starts the ball rolling by making a complete manufacturing-layout chart. As he completes the chart, he often uncovers design inconsistencies.

If a design snag is found, it's ironed out in the original drawing. Thus, refinements can be made in early-tooling stages.

In machining complex contours, the full-scale layout proves a very necessary step. It's also a timesaver on long runs. After it's completed, "checking masters" and other special tooling are built.

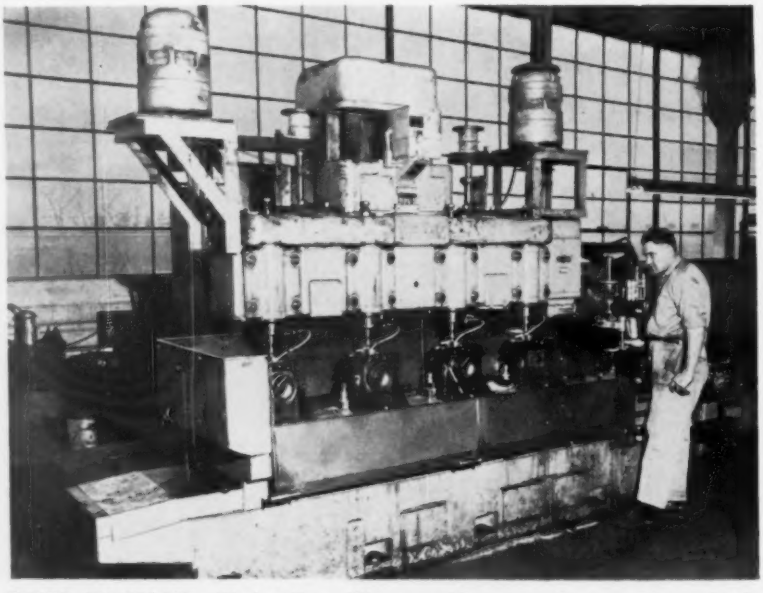
The master checking tools serve a dual role. Their primary function is for inspection purposes; but they also aid the production engineer. They show him what the parts will look like in three-dimensional form.

Rough Cuts—Most of the precision space-age parts are machined from forged blanks. A few are cut from wrought stock. In all cases, the first step hinges on a rough turn to remove the outer case. This deep cut must be taken very slowly.

After the outer case is removed, each blank is carefully inspected. An ultrasonic-immersion tester pinpoints all defects, before any further machining takes place. It spots internal flaws that would have cropped up in final - machining stages. This saves time and money.

Next, each sound blank is milled to desired shape. Roughing cuts bring it down to profile form. A special four-spindle milling machine handles four parts at the same time. About 0.02 in. of stock is left for final finishing.

Thorough Check—After profiling, each part returns to the inspection department. Again, it's checked for soundness. If it's flaw-free, the



FOUR IN HAND: Hydraulic milling machine cuts four turbine wheels from a rough-turned forging blank. Final tolerances are 0.0002 in.

profiled part goes back to the machine shop.

Final close-tolerance profiling of hubs and shafts is usually done on hydraulic tracer-controlled lathes. Some parts require grinding or other processing for deep, narrow slots or hard-to-reach flat surfaces.

Since designs vary quite a bit, special tooling is the rule—not the exception. Very often, thin-section wheels are filled in with a lightweight cast metal after they're rough profiled. This gives the blades stability. Thus, this simple trick allows milling without undue distortion or flexing even when blades are shaped to 0.0065 in. in thickness.

Thinner Sections — How does Hercules shape even thinner blade sections? What's the solution if the opening for machining is so narrow and deep that conventional profile cutters can't be used?

These problems aren't insurmountable. They're readily solved with electro-discharge machining. If the stock removal is low, with tight tolerances, this relatively-new process can save the day.

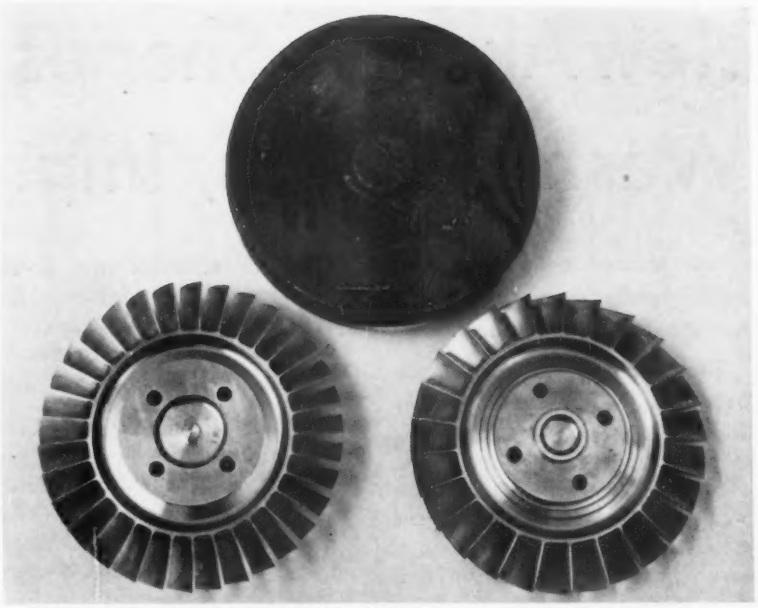
For success in machining hard alloys, many critical factors must be controlled. The cutting tool is one place to start. Generally, carbide cutters will do the job. These cutters speed complex profile work.

On some jobs, high-speed steel cutters replace the carbide tools. This is done whenever the carbide tends to chip. If steel cutters are used, slower speeds, smaller feeds and lighter cuts are a must.

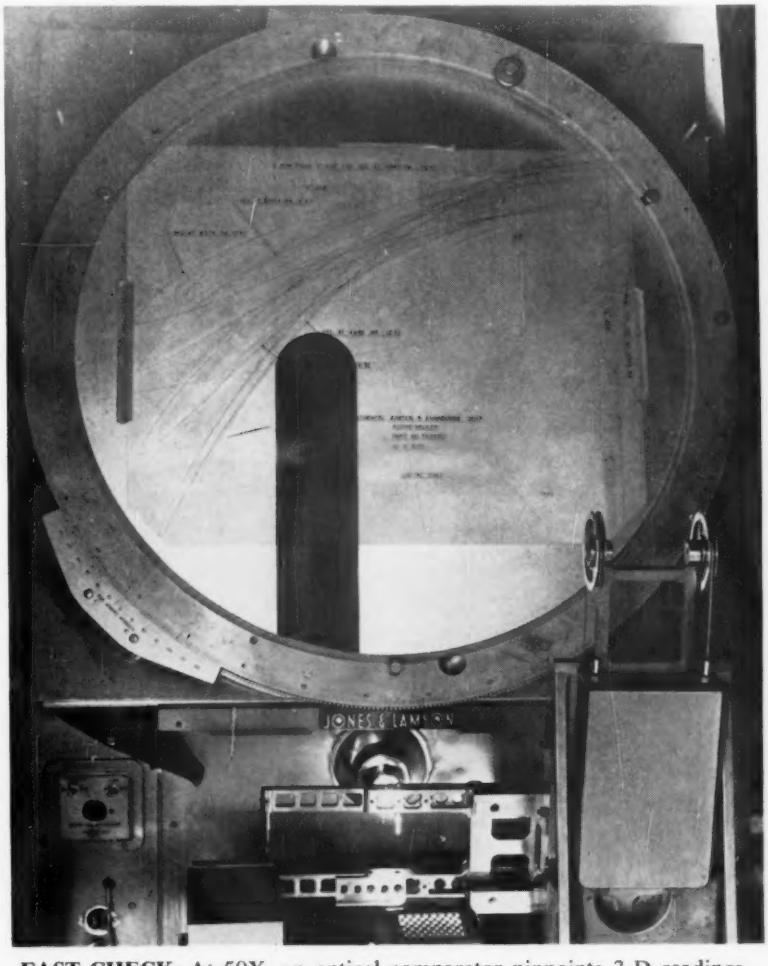
Rugged Setups — Although the workpiece may be small, it takes a rugged machine to handle the job properly. Also, the old-standby principles developed in tool and die work apply.

All setups must be firm and solid. Tools and holders have to be sturdy with heavy backups or supports. The machine itself must be rigid. It's got to have sufficient mass to handle this heavy-duty work.

Finish grinding brings some of the hardest parts down to final dimensions. Then a vapor-blasting step relieves residual stresses.



TYPICAL PARTS: Forged blank (top) is machined into a turbine or missile rotor. Several wheel types are formed from the super-hard blanks.



FAST CHECK: At 50X, an optical comparator pinpoints 3-D readings.

New Alumina Shapes Hard Steel, Washes Molds, Improves Paint

Hot pressed from aluminum-oxide powder, an easily-made tool machines hard metals.

This same powder can serve as an abrasive, a paint thickener or as a ceramic binder.

■ A new colloidal alumina can be used to machine steel or to cut glass. In another form, this same basic chemical even improves the smoothness of skin lotion.

The newcomer is called Baymal. It's a product of E. I. du Pont de Nemours and Co., Inc.

Research scientists who developed Baymal say it has more unique properties and use possibilities than any chemical to emerge from their laboratories in many a year.

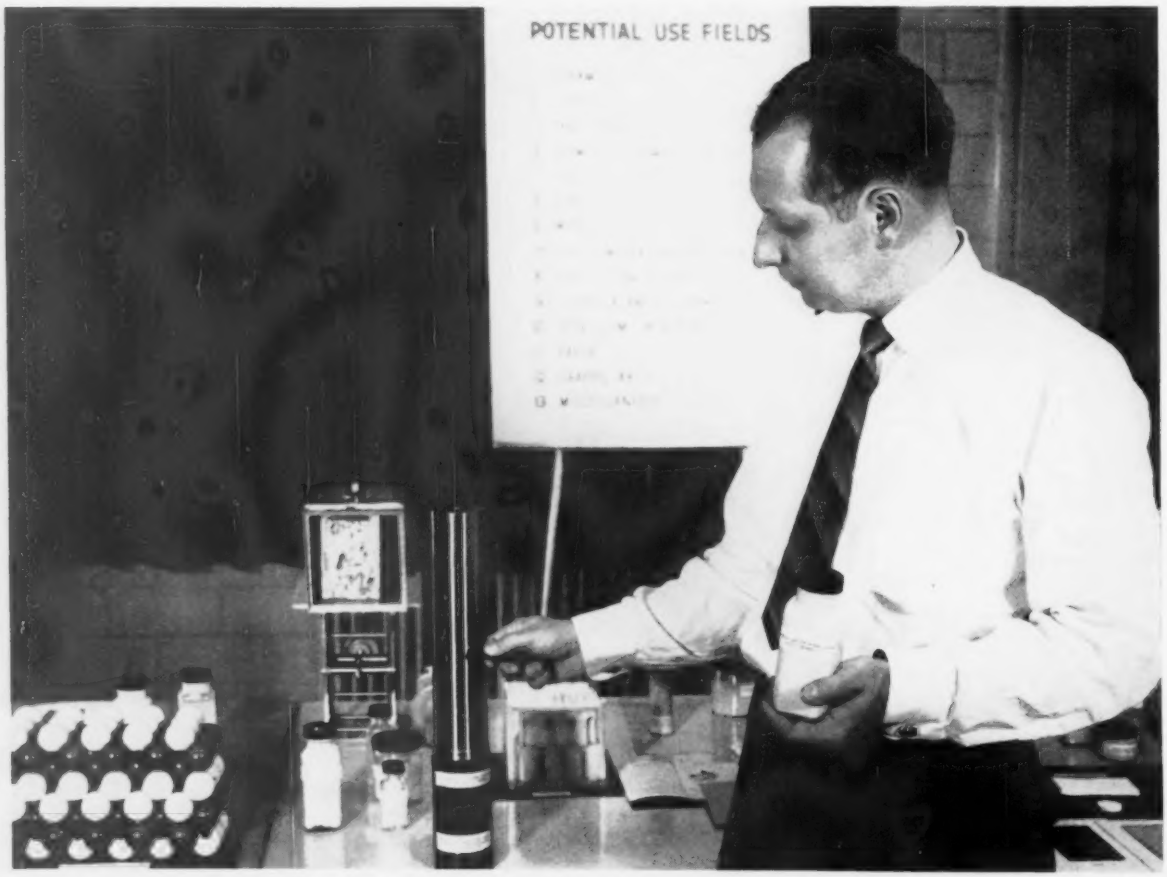
Off Beat—Chemically, Baymal is a white free-flowing powder. It's made up of clusters of tiny fibrils of boehmite alumina. The wide spectrum of potential uses hinges on an unusual combination of properties.

First, the powder can be dispersed with water. As it disperses, it swells up to form a stable colloid.

A second feature centers on the ultra-small fibrillar particles. When a colloidal dispersion of Baymal is dried from water, these small fibrils lie flat. By interlacing on a surface, the fibrils form a film.

Very few inorganic materials and no other aluminas form films in this manner. But such film formations are a must at high heats. Stability at elevated temperatures hinges on a fibrillar-film lattice.

Wetting Agent — Since Baymal particles are quite small, they have a high surface area. If the fibrils in



WIDE RANGE: The machined piece of steel and the laboratory-prepared suntan lotion illustrate the diversified uses for the new colloidal alumina. Potential metalworking uses also cover a very broad range.

a pound of this new alumina were laid end to end, they would make 25 round trips to the moon. The surface area of these same fibrils would cover 30 acres.

When they're dispersed in water, Baymal fibrils assume a positive charge. Thus, they can fix themselves to negative surfaces such as glass, clay and wood. Over wood, a Baymal coating insures long-lasting patterns or molds.

Baymal is both hyrophilic and organophilic. It's wet by both water and certain organic liquids. This lets it act as an emulsifier and/or a thickening, dispersing and suspending agent in both water and water-alcohol systems.

Nontoxic—Also, Baymal has low toxicity. In fact, it's so low that du Pont has applied to the Food and Drug Administration to get clearance for using the colloidal alumina in cosmetics and pharmaceuticals. This means that Baymal will be perfect for making food-handling equipment.

In water, a dilute solution of Baymal assumes unusual viscosity characteristics. For example, a 4 pct dispersion changes from a very fluid solution to a very viscous sol or paste.

There's a slight change in acidity, as the viscous paste is formed. The paste is highly thixotropic. In such a state, a gel remains in solid form until it's shaken or agitated.

Mold Cleaner?—Agitation transforms the gel into a liquid. After it stands awhile, the liquid again becomes a solid gel. This reversible transformation can be reproduced any number of times. And the time delay for the gel to set up can be tailored from less than a second to more than a day.

Let's run through some of the metalworking uses for the new colloidal alumina. It can be used as thermal barriers, for electrically conducting or insulating coatings, as lubricants and as a tough wear-resistant coating to upgrade thermal, abrasive and chemical resistance of ceramic linings for furnaces.

Other possible uses include: Investment-casting molds, foundry-mold washes, powdered-metal products and plastic coatings.

With ceramics, the newcomer can act as a thickener or suspending agent in slips and glazes. Used as an organic binder, it increases both green and ultimate-fired strengths.

Paint makers should also keep their eyes on this wonder material. It's going to find a lot of uses as a thickener for aqueous non-drip paints. Other uses in the paint field include a pigment wetter and a dispersing and suspending agent. In addition, Baymal can be used to make anti-static and soil-retardant compounds.

Potential uses don't end here. Due to its unusual properties, the new chemical can even be used to remove paint. It will boost the effectiveness of acid cleaners, abrasives and polishes.

Check Composition

Ingredient	pct
AlOOH	83.1
CH_3COOH	9.8
H_2O	5.2
SO_4	1.7
Trace Elements	0.2
	100.0

Choose Desired Consistency

Consistency of Dispersion

Conc. of Baymal Powder, pct	No Added Barium	5.7 pct $Ba(OH)_2.8H_2O$ or Equivalent Barium Acetate Added, Based on Baymal Powder
40	Extremely stiff plastic, extrudable mass	Slightly less stiff extrudable mass
25	Soft extrudable mass	Smooth, translucent, grease-like paste
21	Soft extrudable mass	Soft paste, fluid when vigorously stirred
15	Too thick to stir with propeller	Semifluid paste, thin when stirred
12	Barely stirrable with propeller	Viscous fluid
10	Fluid when stirred, thickens at once when stirring stopped	Fairly thin fluid; will penetrate fibrous materials

Typical Physical Properties

Specific surface area		274 sq m/g
Pore volume		0.53 cc/g
Pore diameter		77 Angstroms
Bulk density	loose	26 lb/cu ft
	packed	31 lb/cu ft
Absolute density (fibril)		2.28 g/cc
Refractive index (fibril)		1.580 n_{25}^{D}
Oil absorption		147 (ASTM method D-281-31)
Color		White
pH—4 pct sol		3.8 (with KCl bridge/calomel cell) 4.3 (no bridge)
Particle charge in sol		Positive

Argon Teeming: Extra Refinement To Vacuum Degassing of Steel

Removing unwanted gases in alloy steels has been a problem for many years.

One company reports success by combining vacuum degassing in the ladle with argon teeming.

■ Two new steelmaking refinements are measurably improving aircraft-quality alloy steels.

One is a method of pouring vacuum-degassed steel through a blanket of argon gas into ingot molds filled with argon.

The second is the development of a method to put additives into the molten steel while the ladle of steel is under a high vacuum inside the degassing chamber.

Combines Techniques—As practiced by A. Finkl & Sons Co., Chicago, the technique combines the Finkl process of vacuum degassing in the ladle (IA—Aug. 13, '59, p. 86) and the Linde Co. process of argon teeming (IA—Oct. 1, '59, p. 73).

It prevents oxygen in the outside air from reaching the degassed steel while it is being teemed.

The linecut shows the relationship of the refining steps. At the left, a basic electric furnace is shown tapping double-slagged steel into the ladle.

Lowers Gas Content—Next, the ladle is shown in the degassing chamber which has a cover fitted with a hopper. A vacuum treatment of about 15 minutes reduces hydrogen by ⅔, oxygen by ½, and nitrogen by ⅓.

Releasing of limestone, aluminum and other additives from the airtight hopper is next. Stirring into the melt is by helium.

At the right is shown the teeming of degassed steel into an ingot mold. Although degassed steels have a tight stream, there is a chance for gas pickup during air teeming.

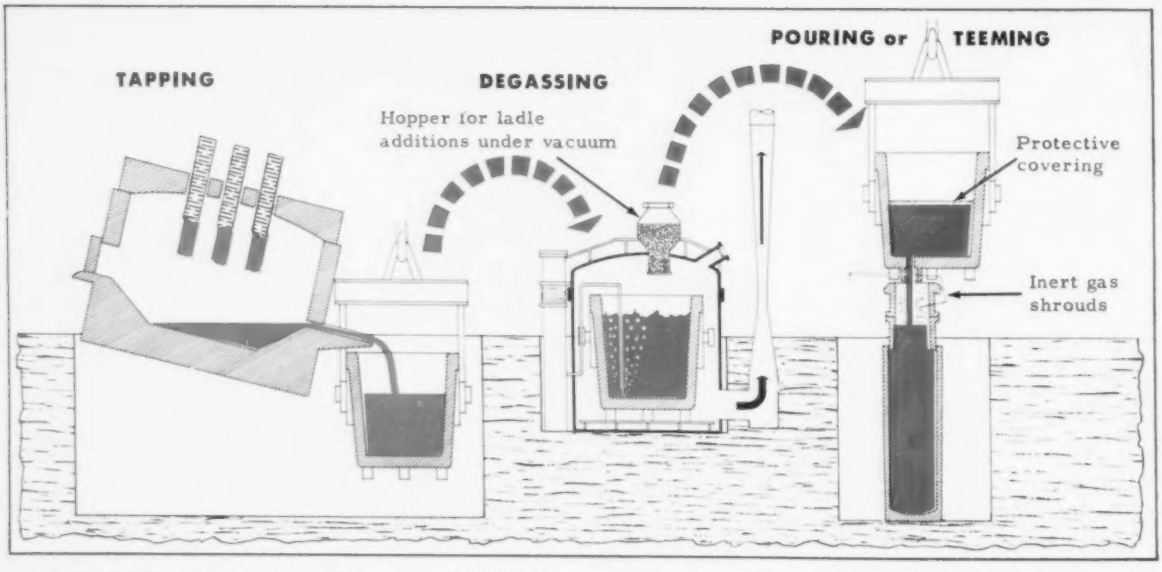
The argon-teeming process has two phases. First is displacement of air in the ingot mold with argon. Second is provision of an argon shroud around the stream during its descent into the mold.

The original Linde Co. technique was modified by Finkl engineers, according to William Wilson, director of research and development, A. Finkl & Sons Co. Here's how it works.

Seal the Molds — Before argon teeming, ingot molds must be sealed after regular cleaning and inspection.

First, the mating surfaces on the stool and mold are gasketed with asbestos paper (or fiberboard) and silicate cement.

How New Steps Fit Into Steelmaking Process



STEP BY STEP: After tapping, ladle moves to chamber for degassing and treatment with additives under vacuum. Then, degassed and treated melt is teemed into ingot molds through protective argon shroud.

Next, the gap between the mold and hot top is packed with asbestos rope and covered with a mastic.

Then, the hot-top opening is covered with heavy aluminum foil which rests on mastic and is held in place with a steel ring. A flap, cut in the foil, permits insertion of the argon diffuser and a gas-sampling tube. This flap can be resealed with tape after argon filling.

Fill in Order—Practice at Finkl & Sons is to argon-fill all molds in teeming order with the last mold filled just before teeming the first ingot. This practice is feasible, says Mr. Wilson, because eight or fewer ingots are teemed per heat.

A diffuser, lowered to the mold bottom, displaces the air with heavier-than-air argon. A flow rate of 3000 cu ft per hour of argon fills a 23-in. ingot mold for an 8000 lb ingot in 30 seconds.

Air samples, taken from the top of the ingot body, always show a residual oxygen below 0.5 pct if filling techniques are as prescribed. A well-sealed mold reportedly maintains less than 1 pct of oxygen until teemed.

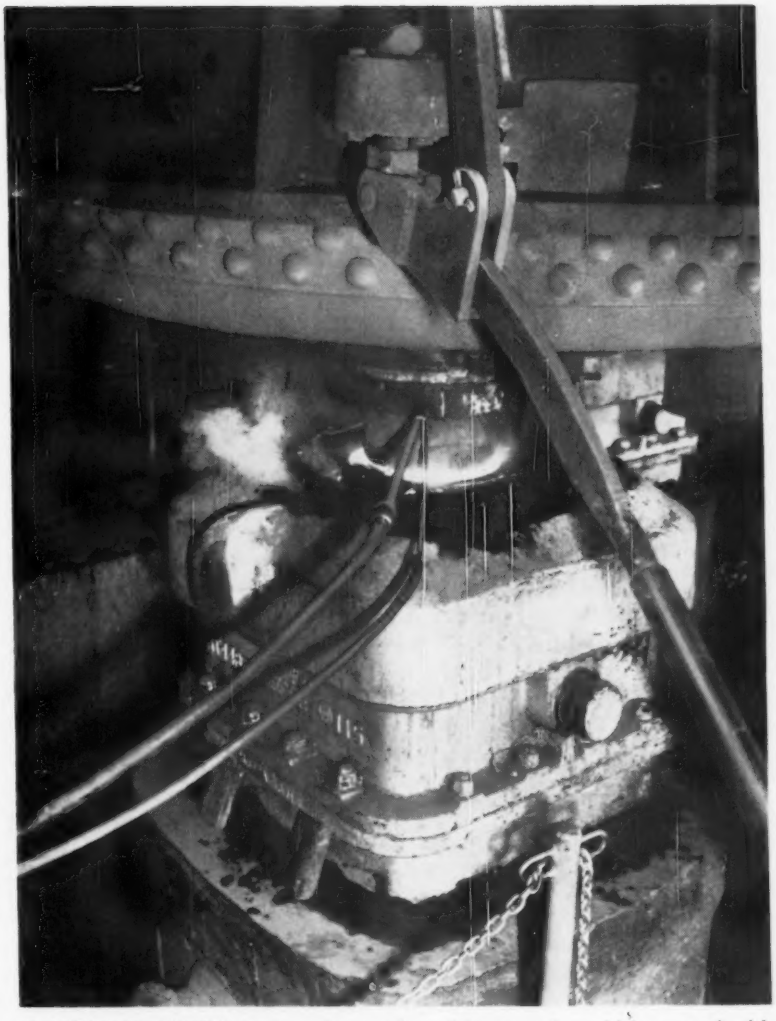
Start Argon Flow — Just before teeming, the teem-stream protector is attached to the bottom of the ladle and starts an argon flow about 10 seconds before the nozzle is opened.

During teeming, the flow is a steady 800 cu ft per hour. A continuous oxygen analyzer shows that the argon shroud keeps oxygen below 1 pct during teeming.

Argon consumption averages 20 cu ft per ingot ton. This relatively high rate results from the low average teeming rate of 1⅓ tons per minute.

Must Pass the Tests—First tests were with 40-in. ingots — each weighing 17.5 tons. Two heats were used. On the first heat, one ingot was air teemed and a second ingot argon teemed. This order was reversed for the second heat.

Samples for gas analysis were cored from the surface, midpoint and center locations of blocks forged



CHECKS OXYGEN: Before degassed steel is poured, mold is purged with argon. Device monitors progress by continuously analyzing oxygen.

What Happens to Properties?

Gas Contents

Teemed In	Hydrogen	ppm Oxygen	Nitrogen
Argon	**1.5**	**31**	**26**
Air	**1.7**	**40**	**37**

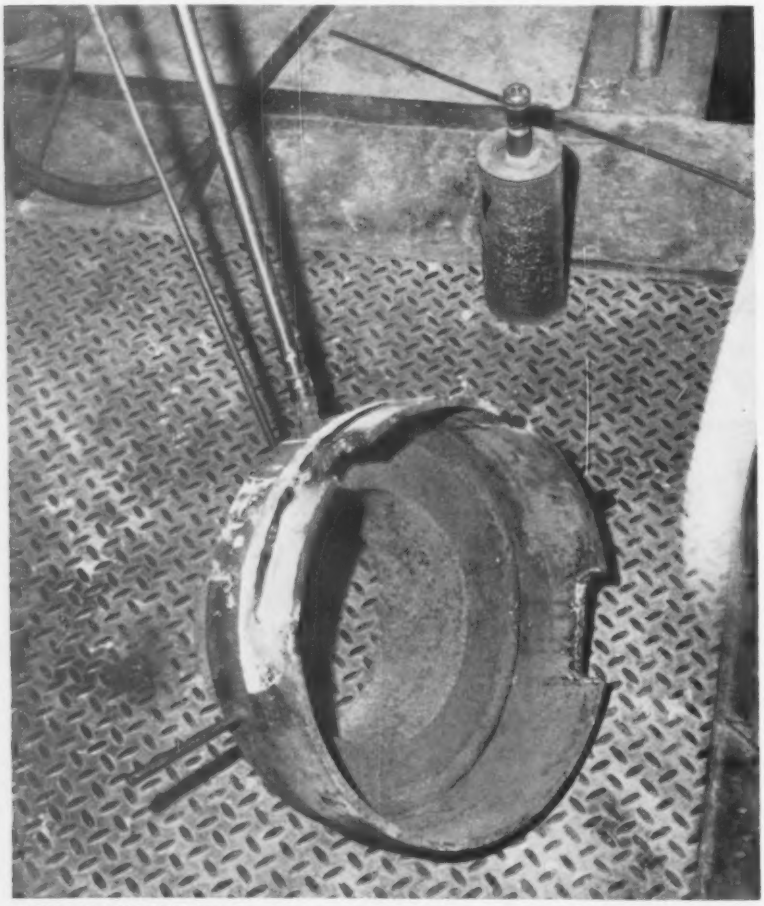
Frequency of Magnetic Indications

Size, in.	1/10-1/8	Over 1/8-1/4	Over 1/4-1/2
Frequency/sq ft	**4.5**	**1.5**	**0.13**

Mechanical Properties

Tensile Strength, psi	Yield Strength, psi	Elongation, pct
190,000-210,000	**178,000-195,000**	**9.5-13.5**

EXPELS ARGON: Puffy smoke indicates argon is being expelled from ingot mold during teeming. Note how close argon collar is to top of mold.



WHAT'S NEEDED: Equipment for argon teeming includes: Diffuser (top—right) which fills mold with argon; collar (bottom—left), which is fastened to ladle bottom, and prevents air from reaching teeming metal.

from the middle of all four ingots. Results show that a definite gas pickup occurs during teeming in air, says Mr. Wilson. And it probably would be of concern for critical applications.

Seventy argon-teemed aircraft-quality steel ingots were forged to 15½ in. diam rounds and heat treated. The alloy was AISI 4340 with above normal silicon and molybdenum. The table summarizes their mechanical properties.

Shows Less "Freckles"—In another test, slices were taken from both pairs of blocks and etched simultaneously. This test showed, adds Mr. Wilson, that steel, poured in an argon shroud has fewer "freckles."

Wet magnetic particle inspection is becoming essential for all superduty steels used for aircraft and missiles.

First, a section, taken from immediately adjacent the product, is forged to a standard diameter round. After heat treatment and smooth finishing, the test bar is circularly magnetized while a suspension of magnetic particles flows onto the surface.

Inclusions Line Up—Any indication that forms is taken to a length of inclusions. Usually it represents an aligned group of inclusions of fractional inch lengths linked together by the magnetic particles. Single inclusions of fractional inch lengths are a rarity.

Recently, 275 sq ft of test surfaces were examined from 11 heats melted according to aircraft practice, degassed in the ladle, and teemed with argon.

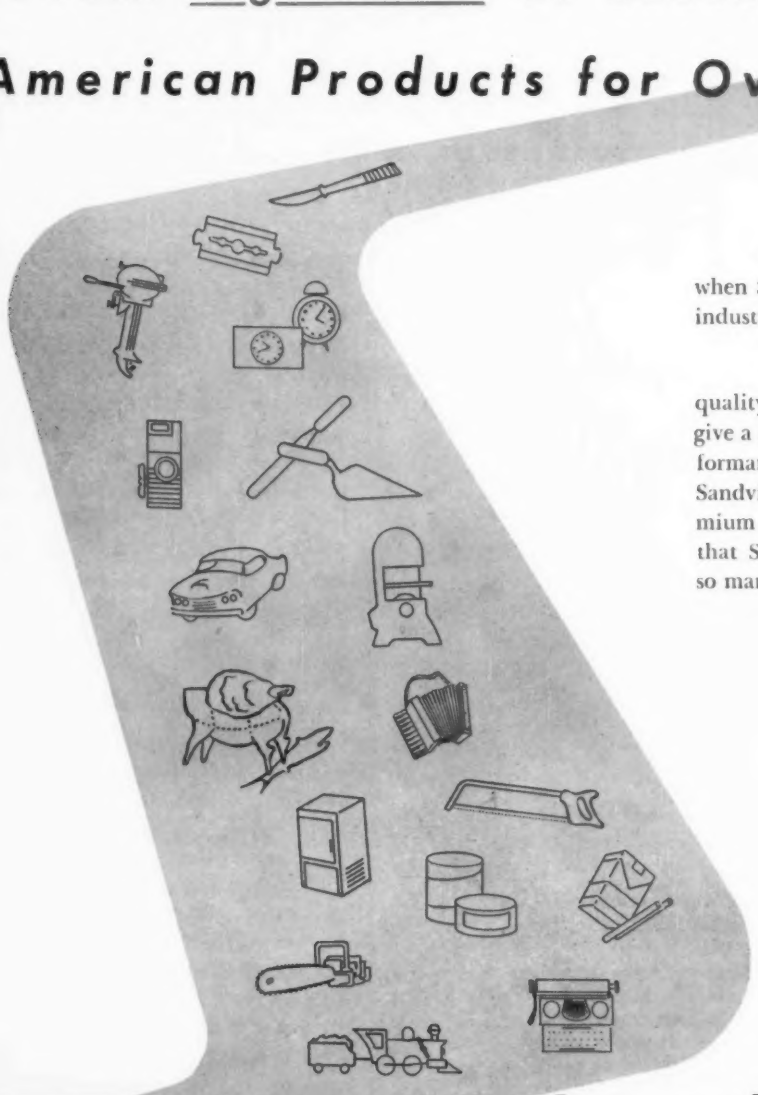
Results of magnetic-particle inspection showed a frequency of 4.5 indications per sq ft of inclusions 1/10-1/8 in.; 1.5 for inclusions over ⅛-¼ in.; 0.13 for inclusions over ¼-½ in.

Reprints of this article are available as long as the supply lasts. Write Reader Service, The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Ask for Reprint **No. 171**

SANDVIK QUALITY

. . . An *Ingredient* of Successful American Products for Over 40 Years



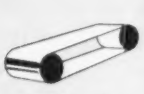
As a matter of fact, *even before* 1919 when Sandvik was incorporated, American industry used Sandvik products.

The reason, then and now, is Sandvik quality—the ability of Sandvik products to give a consistent, predictable, premium performance. It is by this performance that Sandvik has earned its reputation for premium products. It is by this performance that Sandvik contributes to the success of so many American products.

Throughout the U. S. and Canada you'll find Sandvik offices and warehouses conveniently located to put Sandvik quality at your service.

5 SANDVIK QUALITY PRODUCT LINES

SPECIALTY COLD ROLLED SPRING STEELS, WIRE AND TUBING



STEEL BELT CONVEYORS AND PROCESSING UNITS

CORONANT CARBIDE TOOLING

POWER SPRINGS

HAND SAWS AND TOOLS

SANDVIK STEEL, INC.

1702 Nevins Road, Fair Lawn, N. J. • Tel. SWarthmore 7-6200 • In N. Y. C. ALgonquin 5-2200
Branch Offices: Cleveland • Detroit • Skokie, Ill. • Los Angeles
SANDVIK CANADIAN LTD: P. O. Drawer 1335, Sta. O, Montreal 9, P. Q.
Works: Sandviken, Sweden

SANDVIK

SS-230

SAFE, RELIABLE POSITIVE CONTROL

Convenience, positive control and protection for the operator are provided by the pistol-grip, push-button control station of the Coffing Quik-Lift electric hoist.

Loads can be raised or lowered while pulling a trolley mounted hoist since a strain cable is incorporated in the control cord. The control station is made of non-conducting, impact resistant plastic and the 115 volts at the station plus the interlocked push buttons make for safe operation. The V-type brake assures positive control of loads. Housing is of strong but light aluminum which makes for portability.

Ask your distributor about the twenty JF models with capacities ranging from ¼ to 2 tons or write for Bulletin ADH-65-CC.

COFFING HOISTS

DUFF-NORTON COMPANY

Four Gateway Center, Pittsburgh 22, Pennsylvania

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

NEW PATENTS

Improves Castings

Method and device for casting steels and other ferrous compounds in ingot molds, H. J. Daussan, Mar. 28, 1961. An improved method for casting effervescent and killed steels, alloy steels, and the like bans atmospheric air from the molten bath. U. S. 2,976,587.

Pre-Refines Pig Iron

Process for the continuous pre-refining of molten pig iron, P. Leroy and R. Simon (assigned to Institut de Recherches de la Siderurgie, St. Germain - en - Laye, France), Mar. 14, 1961. In the pre-refining of silicon-content, molten pig iron, minute moving gas bubbles insufflate a continuous stream of the metal. Most of the silicon is oxidized during insufflation. A temperature modifier maintains the desired oxidation temperature. U. S. 2,975,047.

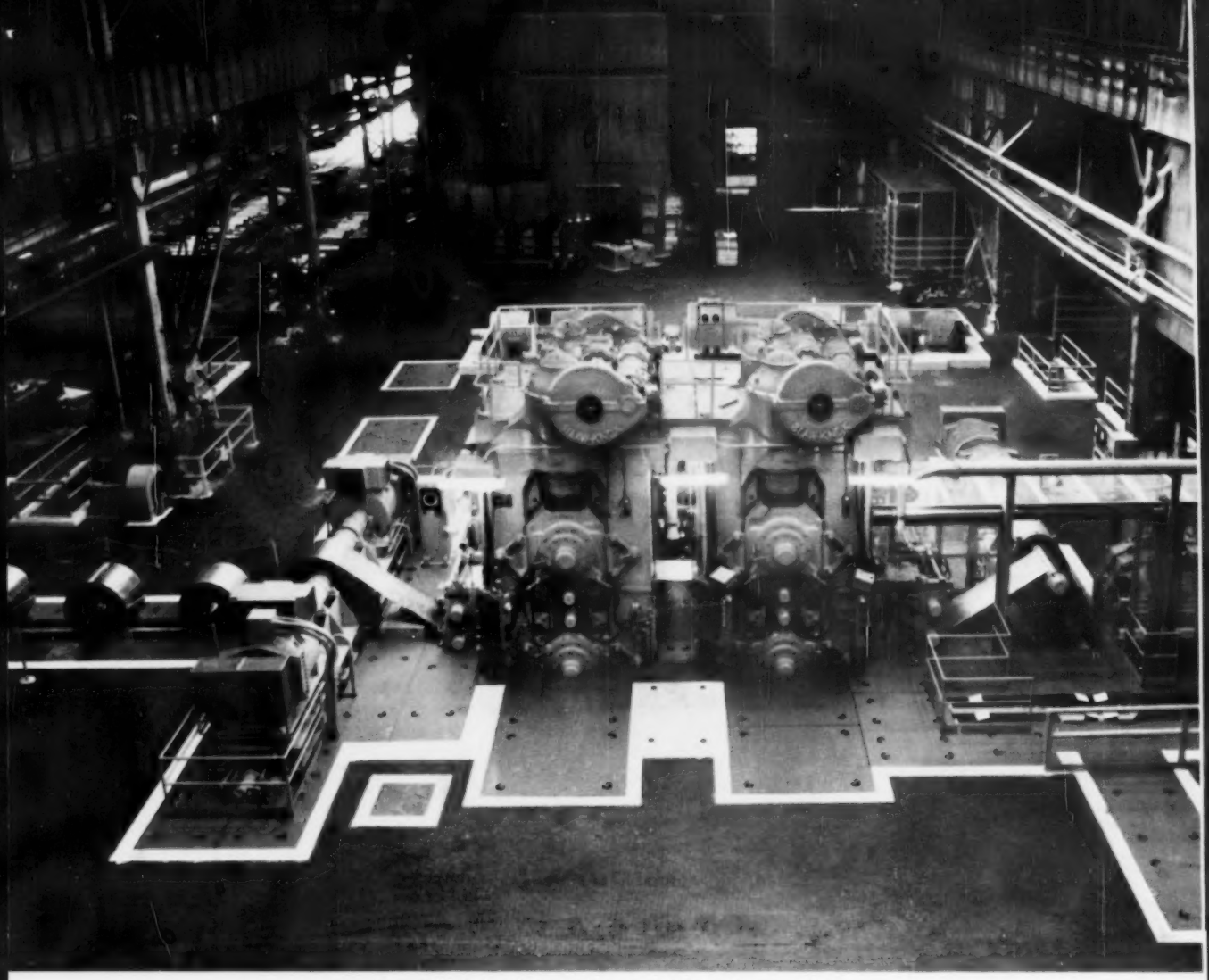
Low-Alloy Steel

Corrosion - resistant, low - alloy steel, J. C. Holzwarth and R. F. Thompson (assigned to General Motors Corp.), Feb. 7, 1961. A corrosion-resistant steel that can be cold worked and used in sheet form consists of 0.04-0.2 pct C, 0.3-0.8 pct Mn, 0.1-0.4 pct Mg, 0.1-0.25 pct As, 0.05-0.25 pct Sb, 0.07-0.15 pct Sn, 0.005-0.05 pct P, 0.01-0.1 pct Ci, 0.001-0.02 pct S, not more than 0.2 pct Al, and the balance Fe and incidental impurities. Canadian 614,117.

Removes Silica

Mineral concentrating and separating apparatus, N. H. A. Rodman and A. Arbetman (assigned to Oreclone Concentrating Corp.), Mar. 28, 1961. A multi-stage centrifugal concentrator is especially useful for removing silica from iron-oxide ores. U. S. 2,976,994.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.



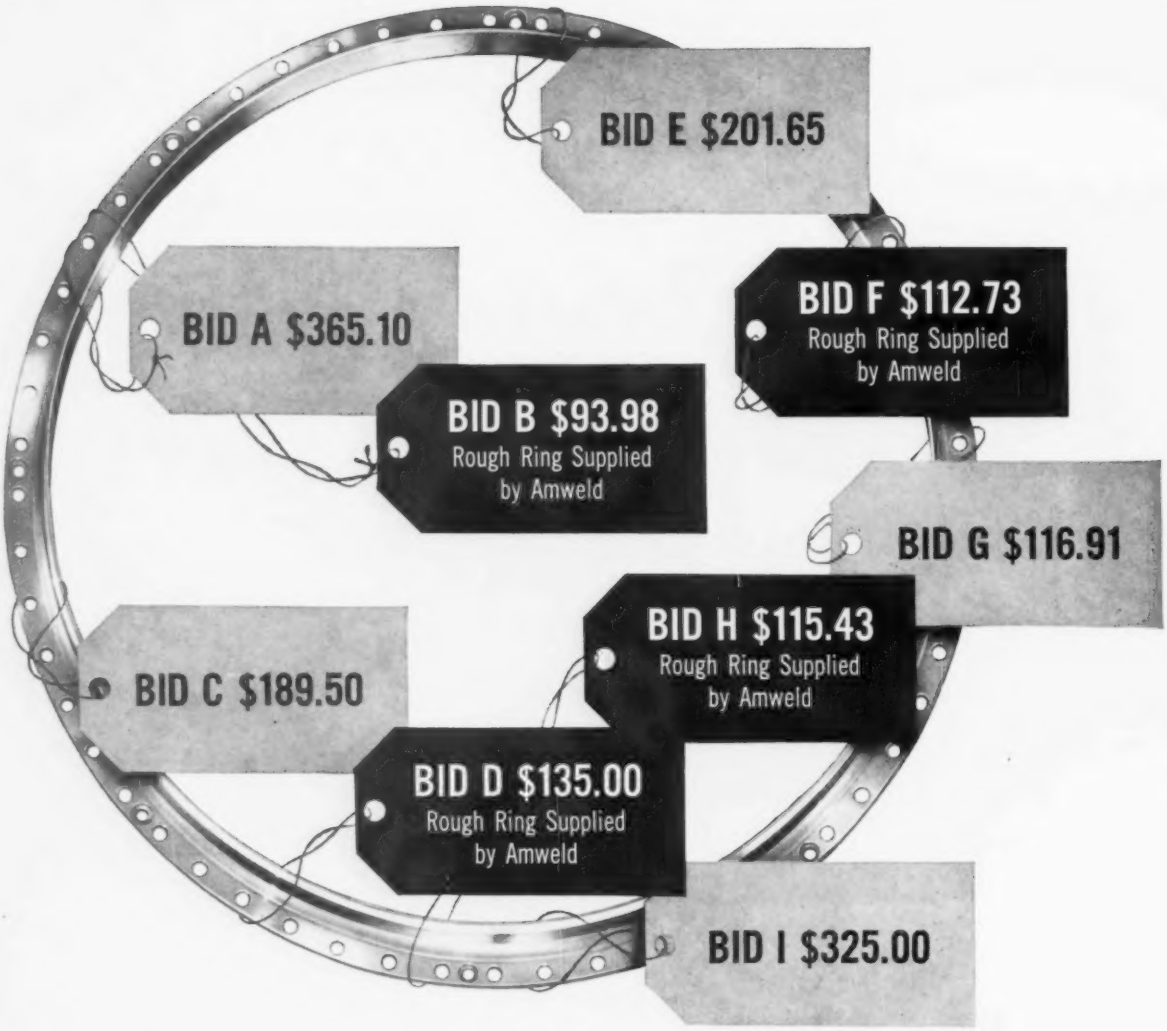
19- and 53-inch x 48-inch high speed 2-stand Temper Mill.

BLAW-KNOX TEMPER MILLS

Blaw-Knox designs and builds a full range of two high and four high Temper Mills for integration into sheet, strip, and tin plate processing operations. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pa.

BLAW-KNOX

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves



FOUR OUT OF FIVE LOW BIDDERS BASE QUOTES ON ROUGH RINGS BY AMWELD

Early this year nine companies submitted manufacturing bids ranging from $93.98 to $365.10 on this circular jet engine turbine shroud. **Four out of the five lowest bidders submitted their finished shroud quotation based on rough rings, flash butt-welded, furnished by Amweld.**

Whether you're bidding for military or commercial business, Amweld flash butt-welded rings can save you money—can help you get more business. The quality of Amweld rings has been proved repeatedly in jet engines and missiles. The cost reduction opportunity presented by Amweld rings enabled Amweld customers to save over $1,000,000 on circular components and assemblies last year alone.

Investigate now! Let Amweld review your circular component requirements and figure actual cost savings to you with Amweld flash butt-welded rings. Send your drawings and specifications today: The American Welding & Manufacturing Co., 703 Dietz Road, Warren, Ohio.

AMWELD®
INDUSTRIAL PRODUCTS

THE AMERICAN WELDING & MANUFACTURING CO., WARREN, OHIO

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Machine Equipment

A new metalworking-equipment publication provides a quick, handy report on the company's product development and new applications. The first issue introduces a 48-in., cut-up line for cold- or hot-rolled mild - steel coils. The newsletter gives complete specifications on the line. In addition, photographs show the entry side and the run-out end of the equipment. (The Yoder Co.)

For free copy circle No. 1 on postcard

Spring-Design Manual

Aimed at engineers and purchasing agents, a new, 16-page manual gives the authoritative information needed to specify custom design and standardized springs. It emphasizes performance, accurate material selection and quality-control measures (Associated Spring Corp.)

For free copy circle No. 2 on postcard

Scale Catalog

A 2-color illustrated catalog discusses weighing problems found in industrial, laboratory and commercial applications. It also gives the details on a line of scales and weighing equipment designed to solve these problems. Scale sizes range from 50 grams to 100 lb. More than thirty models are available in the line, to suit just about any situation. (The Exact Weight Scale Co.)

For free copy circle No. 3 on postcard

Liquid-Level Valves

Two, new, 4-page catalogs illustrate and describe the features, styles, sizes and construction details of many liquid-level gage valves. Included are rough drawings and detailed tables of standard and optional features. (Jerguson Gage & Valve Co.)

For free copy circle No. 4 on postcard

Aluminum Foil

The sparkling beauty of aluminum foil is easily demonstrated by the brilliant foil cover of a colorful new booklet. The literature introduces the reader to the research and development of foil, and how this has contributed to the packaging, textile, building and electrical fields. (Aluminum Co. of America)

For free copy circle No. 5 on postcard

Anniversary Brochure

Commemorating the 50th anniversary of the Cambridge Wire & Cloth Co. is a special 6-page brochure. In addition to information on conveyor belts, wire cloth and wire-cloth fabrications, the literature contains a brief descriptive history of wire from as far back as 5000 B. C.

For free copy circle No. 6 on postcard

Gear Production

Illustrating typical gears and splines, a selector data sheet shows the best processing method for each, depending on high-, medium- or low-production requirements. By following these processing suggestions, it is claimed, quality can be raised and costs reduced. (Michigan Tool Co.)

For free copy circle No. 7 on postcard

Automated Steel Mill

"The Automatic Stockhouse," a paper delivered by John F. Meissener to the Association of Iron and Steel Engineers, has been reprinted from the association's publication, Iron and Steel Engineer. In his paper, Mr. Meissener outlines an automated steel-

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **5/18/61**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

Page ..... Product .....

Page ..... Product .....

INVALID WITHOUT COMPANY NAME AND TITLE
PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone ..... State .....

FIRST CLASS
PERMIT No. 36
NEW YORK, N. Y.

BUSINESS REPLY MAIL
No postage necessary if mailed in the United States

POSTAGE WILL BE PAID BY

THE IRON AGE
Post Office Box 77, Village Station
NEW YORK 14, N. Y.

BUSINESS REPLY MAIL

No postage necessary if mailed in the United States

FIRST CLASS
PERMIT No. 36
NEW YORK, N. Y.

POSTAGE WILL BE PAID BY

THE IRON AGE

Post Office Box 77, Village Station

NEW YORK 14, N. Y.

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **5/18/61**

Circle numbers for Free Technical Literature, Design Digest, or New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90

If you want more details on products advertised in this issue fill in below:

Page ..... Product .....

Page ..... Product .....

Page ..... Product .....

INVALID WITHOUT COMPANY NAME AND TITLE
PLEASE TYPE OR PRINT

Name .....

Title .....

Product Manufactured .....

Company .....

Co. Address .....

.....

City ..... Zone ... State .....

FREE LITERATURE

mill system. The system receives, stores and recovers raw materials, and moves them to the sintering plant or blast furnace, all automatically. (Meissener Engineers, Inc.)

For free copy circle No. 8 on postcard

Tool Accessories

All the information about two complete lines of shank - milling, boring and drilling accessories is included in a new general catalog. Extensive use of dimensional drawings has cut text material to a minimum, without sacrificing clarity. Many of these drawings are cut-away views that illustrate the operating principles of the units. Wherever possible, information has been presented in tabular form. (Beaver Tool & Engineering Corp.)

For free copy circle No. 9 on postcard

Engineering Manual

An introductory section to an 80-page engineering manual is offered by the distributor of a complete line of corrosion-resistant pipe, pipe fittings, sheet and fabrications. It tells a comprehensive story of the company, its policies, history of materials, its engineering and fabrication services, and its products and their characteristics. (Trans-Plastic Corp.)

For free copy circle No. 10 on postcard

Industrial Coatings

A 4-page folder describes 18 special industrial coatings for all types of metal-using industries. The problem-solving coatings fall in four general chemical categories —wax emulsions, resin emulsions, solvent-base waxes and self polishing solvent-base waxes and resins. The folder includes data on application, coverage, drying time and characteristic uses. (Service Products Div., Johnson's Wax)

For free copy circle No. 11 on postcard

Precious Metals

General criteria, for the effective use of platinum metals as catalysts in hydrogenations, are reviewed in the current issue of a quarterly technical bulletin. Other articles deal with a volt-meter, a spectrographic method for determining the impurities in silver, and with the purification of coke-oven gases by hydrogenation over platinum catalysts. The publication also abstracts recently issued U. S. patents concerning precious metals. (Engelhard Industries, Inc.)

For free copy circle No. 12 on postcard

The Uses of Silicone

An 8-page catalog contains data pertaining to various silicone products, including a complete selector guide for silicone rubber. The contents is broken down into four categories dealing with silicone in the following areas—fluids, protective coatings, electrical insulation and rubber. One useful feature of the catalog is the grouping of the product types. They're listed under appropriate end-use headings. (General Electric Co.)

For free copy circle No. 13 on postcard

Torque Motors

Containing speed-torque curves, duty specifications, dimensions and ratings, a new bulletin describes a line of torque motors. The units listed in the literature range from 1.5-96 oz ft. Electrical designs: 110-550 v; 1, 2, and 3 phase ac; and 115, 230 v dc. (Howell Electric Motors Co.)

For free copy circle No. 14 on postcard

Controls Temperatures

Covering hermetically-sealed and semi-enclosed thermostats, a 4-page technical sheet illustrates the line with photos, cutaway sections and line drawings. Full dimensional details, ranges, tolerances, differentials and thermostat ratings are included. (Stevens Mfg. Co., Inc.)

For free copy circle No. 15 on postcard

Tools and Dies

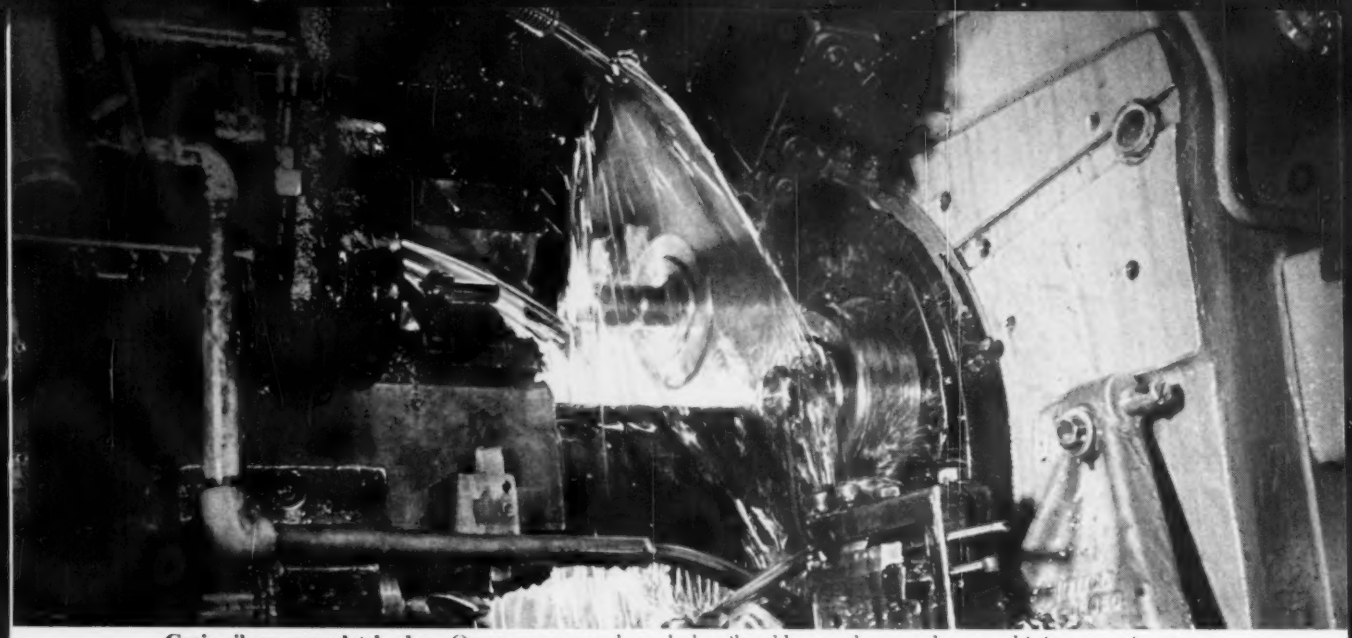
The Spring issue of a company publication highlights some important machining work done for a leading aircraft manufacturer. In a regular column, the company's president discusses the National Tool Show. Also, a candid camera spots designers at their boards. (Allen Tool Corp.)

For free copy circle No. 16 on postcard

Vibration Control

This 4-page brochure stresses the versatility of a line of levelling machine mounts. The mounts effectively isolate shock and noise. They also dampen at least 85 pct of the machine vibration. (Clark-Cutler-McDermott Co.)

For free copy circle No. 17 on postcard



Garia oils are completely clear. Operators can see through the oil and keep a close watch on machining operation.

CUTTING:

Shell puts heavy-duty properties into transparent cutting oils that lengthen tool life three significant ways

Today, Shell's new Garia® Oils are helping machine shops improve metal finish and prolong tool life—even in heavy-duty cutting. And because Garia is transparent, operators can see the work at all times.

Read how Shell Garia Oils can reduce rejects, cut maintenance and overhead costs in your shop.

UNTIL RECENTLY, most heavy-duty cutting oils were opaque fluids which obscured the work.

Shell scientists took up the problem. They experimented with different formulae until they found the *exact combination* that retained the necessary properties—but did not seriously darken the oil.

Now Shell Garia Oils have the transparency of light mineral oils and the rugged qualities of heavy-duty oils.

With Shell's improved Garia Oils, operators can see through the oil film. Work can be inspected more easily.

Garia Oils prolong tool life in three key ways:

1. Garia Oils help prevent metal pick-up. Shell Garia Oils form a more effective film between the work and the tool. This provides better anti-weld protection, and helps prevent metal pick-up on tools.

2. Garia Oils help keep work cooler. Even with high-speed cutting, the metal stays cool.

Cooling helps extend tool life, and helps assure a better finish on the work. Operating costs are lower too.

3. Garia Oils wet faster. They reach the tool point rapidly, cover newly exposed surfaces quickly.

Compact range

Today's range of Garia Oils covers every kind of metal cutting operation.

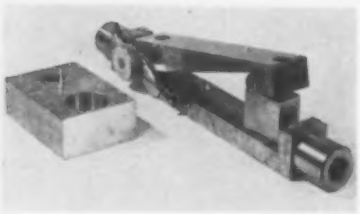
Result: you do not have to carry large cutting oil inventories. You can do more jobs with fewer Garia Oils.

For all the facts, see your Shell Industrial Products Representative. Or write: Shell Oil Company, 50 West 50th Street, New York 20, N. Y.

SHELL

A BULLETIN FROM SHELL
—where 1,997 scientists are working to provide better products for industry

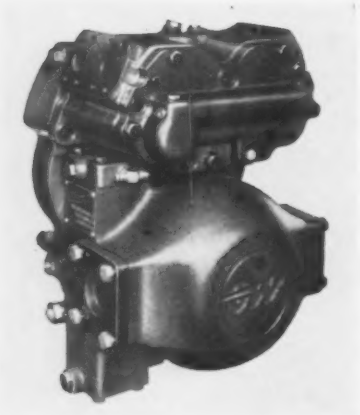
New Materials and Components



Unit Adapts Machine Tool to Cut Angle or Taper

Saving costly time and scrap, a new tool sets up almost any type of machine to cut any angle or taper. There's no need for plugs. And, the makers guarantee accuracy. It's made of high-grade tool steel that's hardened, ground and finely lapped on all work surfaces. Thus, there's built-in wear and ruggedness. It's an inexpensive way to boost output. (Armstrong-Schramm Co.)

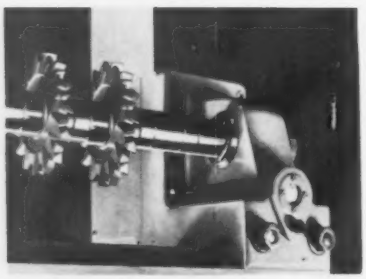
For more data circle No. 20 on postcard, p. 153



Variable-Volume Pump Works Only on Demand

The main advantage of a new hydraulic pump is its variable-volume principle. This means it works only on demand. Unlike conventional units, it pumps no oil in the hold position. In addition, the newcomer moves only the amount of oil required by the job. Thus, more horsepower is on hand for other tasks. And more work with less horsepower has other advantages, too. You use less fuel, and you don't need to worry about heat. As you would expect, there's longer life also. Heart of the units is an assembly containing nine pistons. These rotate with the cylinder block. When the piston assembly tilts, each piston sucks oil into the cylinder block during half the rotation, and forces it out during the other half. These features make the pump a natural for equipment, rail and industrial installations. (Gar Wood Industries, Inc.)

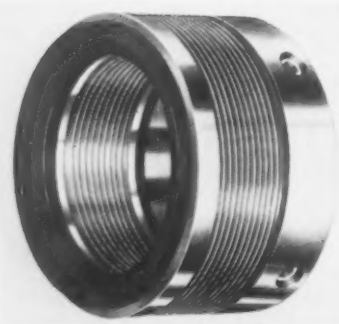
For more data circle No. 21 on postcard, p. 153



Arbor-Support Bearings Minimize Friction

An anti-friction bearing comes in standard sizes to fit a machine tool's arbor-support housing without re-boring. The bearings have a large number of balls, distributed evenly over the bearing race. These provide full-length support and minimize friction. This means longer bearing life and increased arbor rigidity. Since the bearings seat within the support housing, they don't interfere with the work or fixtures. And, bushings adapt the units to any standard-arbor diameter. (Briney Mfg. Co.)

For more data circle No. 22 on postcard, p. 153



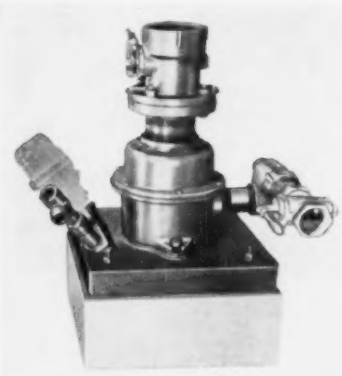
Rotating Seal Features Stainless-Steel Bellows

Accommodating temperatures from —350°F to +800°F, a rotating seal utilizes a stainless-steel bellows. The welded bellows attaches to a drive collar at one end, and to a carbon retainer for the carbon seal ring at the other. In the past, all rotating, face-type seals had the carbon ring sealed to the shaft with a device that would tolerate axial motion. This, of course, put a limit on the temperature range. It also led to shaft wear, fretting and leakage. However, the new, pressure-tight bellows eliminates all dynamic elastomers. Thus, the seals suit many applications in cyrogenic service and with petrochemicals. (Sealol, Inc.)

For more data circle No. 23 on postcard, p. 153

Furnace Burners

Here's a new gas burner that creates a flat, spiral flame which hugs the wall of heat-treat furnaces, galvanizing tanks and similar units. Radiation effect, caused by the flame scrubbing large areas of the furnace wall, increases over-all heat transfer rates. Work can be located very close to the burner without the



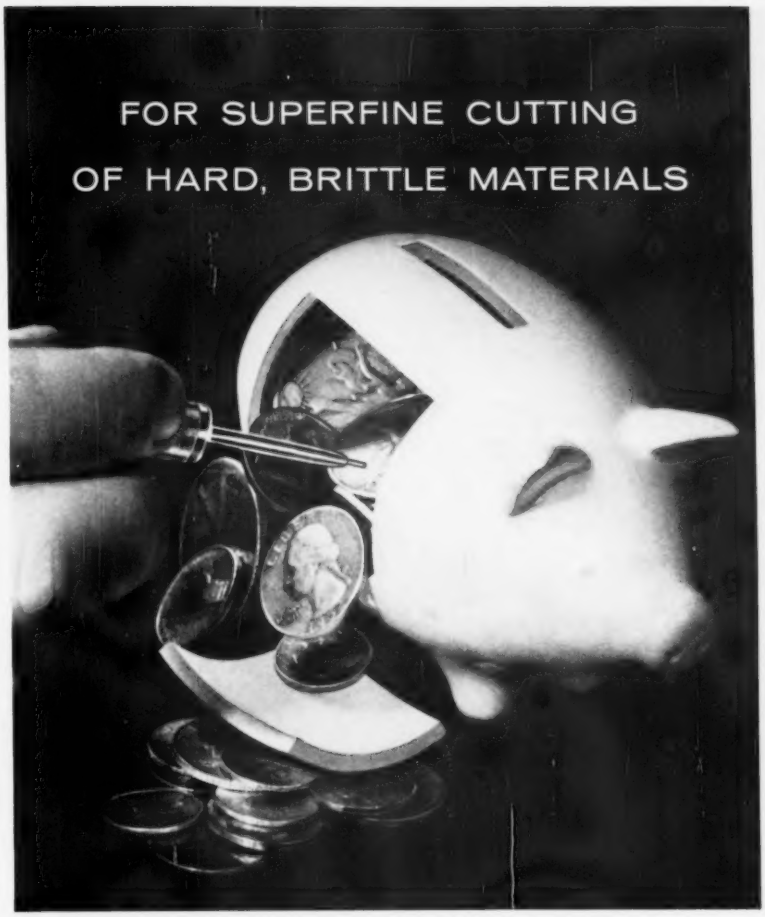
danger of flame impingement or hot spots. As a result, new furnaces can be smaller and less expensive, because there's less heat loss from the wall areas. (Eclipse Fuel Engineering Co.)

For more data circle No. 24 on postcard, p. 153

Protect the Operator

Modulated-light equipment detects the presence of the machine operator's hand in high-danger

areas. The unit uses a pulsating light beam to scan the danger spot. When this beam is interrupted, a signal stops the machine. This prevents serious injury to personnel, before it's too late. Naturally, the device must be selective. This is where the modulating feature enters the picture. Ambient light doesn't



THE S. S. White Industrial Airbrasive® Unit

There may be easier ways to tap junior's piggy bank... but none that could craftily slice a piece out of a fragile ceramic part the way Industrial Airbrasive can.

The secret of the Airbrasive's ability to cut hard, brittle materials is its accurate stream of gas-propelled abrasive. The cutting action is cool and completely shockless. Highly flexible in use, the same tool will make a cut as fine as 0.003" or it will frost, abrade or clean a large area.

Every day new uses are being found for the Airbrasive in production lines and in the laboratory . . . deburring small parts . . . shaping, drilling or cleaning germanium and other crystals . . . wirestripping potentiometers . . . removing fine films . . . printed circuits . . . micromodules . . . and many others!

Important too: the cost is low . . . for under $1,000 you can set up your own Airbrasive cutting unit!

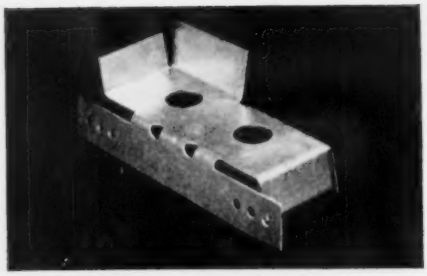
Send us your most difficult samples and we will test them for you at no cost.

SEND FOR BULLETIN 6006 . . . complete information.

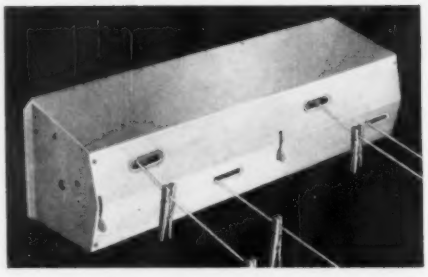
S. S. White

New dual Model D!

S. S. White Industrial Division Dept. 32A, 10 East 40th Street, New York 16, N. Y.

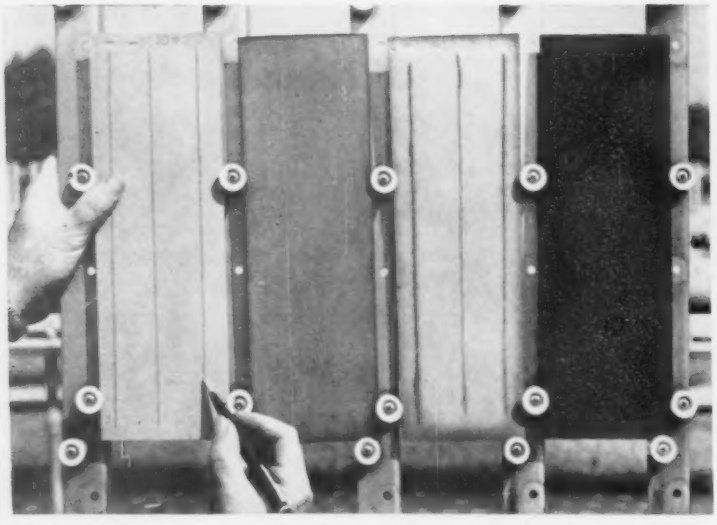


Armco ZINCGRIP Steel



Armco ALUMINIZED STEEL Type 2

5 Armco Coated Steels Can Help



Armco ALUMINIZED STEEL Type 1

Steel

This label identifies modern, dependable steels in your products

After 3-years' exposure outdoors, paint holds tightly to ZINCGRIP A, PAINTGRIP (far left). No rust even where scratched. No rust on the unpainted sample, either (second from left). Samples on the right are phosphate-treated cold-rolled steel, one painted, the other unpainted. Paint has suffered. Rust is evident on the unpainted sample.

1. NEW ARMCO ZINCGRIP® A, PAINTGRIP®. This *new* kind of hot-dip zinc-coated steel is specially prepared to take a paint finish that's every bit as attractive as a paint finish on cold-rolled steel! It's *spangle-free*, holds paint *tighter and longer*, permits *twice as many spot welds* as ordinary galvanized before electrode tips need redressing. It's available *now* in commercial quantities.

2. ARMCO ZINCGRIP STEEL has a tightly adherent zinc coating that gives products durable protection at an *average cost of about 2⅓ cents per square foot.* Savings: About .92 cents per square foot over typical cost of painting. The door part pictured, for example, was previously fabricated from cold-rolled steel, then painted for protection. It is now made of Armco ZINCGRIP at a significant saving.

3. ARMCO ALUMINIZED STEEL Type 1 means greatly increased service life—for mufflers and other consumer, commercial and industrial products menaced by heat and corrosion. Furnace, heater and appliance parts made from this special hot-dip aluminum-coated steel won't discolor to 900 F, won't scale under 1250 F. Reflective parts bounce back up to 80% of radiant heat, remain strong.

New steels are born at Armco

You Fight Costs and Competition

They combat corrosion, solve heat and painting problems.

4. ARMCO ALUMINIZED STEEL Type 2 offers exceptional resistance to outdoor corrosion. In a mild industrial atmosphere, for example, its hot-dip aluminum coating outlasts the coating on unpainted commercial galvanized steel sheets 4-to-1. It reflects heat, too. The manufacturer of the "vanishing clothesline" casing in the photo cites *savings of 30%* in switching from aluminum to Armco ALUMINIZED STEEL Type 2. The reason: ALUMINIZED STEEL permitted reduction in metal thickness without loss of strength. It also assured greater resistance to damage. Ideal for construction products exposed to the weather.

5. ARMCO COLD-ROLLED PAINTGRIP and low painting costs go hand-in-hand. Over a mill-applied electrolytic zinc "flash" goes a paint-holding film. You simply fabricate and paint immediately. Sheets resist rusting in storage, take severe fabrication.

Armco Division
Armco Steel Corporation, Dept. A
1901 Curtis Street, Middletown, Ohio

SEND DATA ON

- ☐ New Armco ZINCGRIP A, PAINTGRIP
- ☐ Armco ALUMINIZED STEEL Type 1
- ☐ Armco Cold-Rolled PAINTGRIP
- ☐ Paint Savings with Armco ZINCGRIP
- ☐ Armco ALUMINIZED STEEL Type 2

Name _____

Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

ARMCO Armco Division

The <IMPERIAL> Line

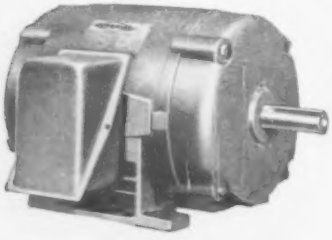
MOTORS • GENERATORS • MOTOR-GENERATOR SETS

BEST POWER FOR STANDARD AND SPECIFIC-PURPOSE APPLICATIONS

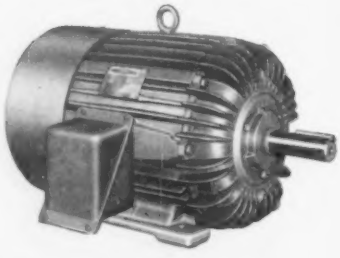
Modern as the missile age . . . Imperial electric motors are created with a background of more than 70 years of industrial drive experience.

Now, through the use of electronic computers, multiple-design review is made possible in advance of production. Optimum performance is assured while delivery of special-purpose designs is speeded.

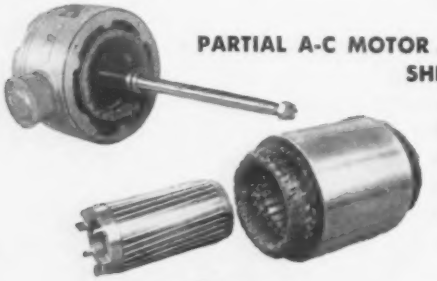
For standard NEMA motors and for motors to meet unusual drive requirements, you will do better with Imperial. Write for bulletin covering *The Imperial Line* of integral horsepower motors, generators and motor-generator sets for every application.



DRIP-PROOF A-C MOTOR—*Today's Best Buy for Most Applications—Ratings from 1 to 200 Hp.—Designs Include Flange and Face Types, Multi-Speed, etc.*



TOTALLY-ENCLOSED, FAN-COOLED A-C MOTOR *Provides Dependable Operation Under Abnormal Conditions — Also Available in Explosion-Proof Design—1 to 100 Hp.*



PARTIAL A-C MOTOR . . .

SHELL-TYPE SHAFTLESS MOTOR *. . . Other Special or Specific Types . . . Provide Maximum Power in Minimum Space . . . Blend with Basic Design of Machines.*

<IMPERIAL> ELECTRIC COMPANY

84 Ira Avenue • Akron 9, Ohio

influence the receiving element since it's tuned to the modulated frequency. (Clark Controller Co.)

For more data circle No. 25 on postcard, p. 153

Miniature Valve

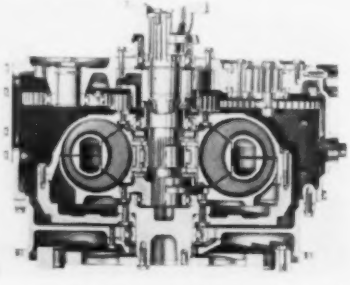
Equipped with tube fitting connections for ⅛-in. tubing, this small valve comes in brass and type 316 stainless steel. It's only 2¼-in. high, in the straight, forged-body model. Thus, the newcomers are a boon to compact instrument design. Straight and angle patterns are also available with ⅛-in. male pipe ends. Other features include: Panel mounting; colored handles to permit color cod-

ing; Teflon cylinder packing; micro-regulating and non-regulating stems. (Whitey Research Tool Co.)

For more data circle No. 26 on postcard, p. 153

Converts Torque

A new line of torque converters has been designed to provide an infinite number of torque-speed ratios



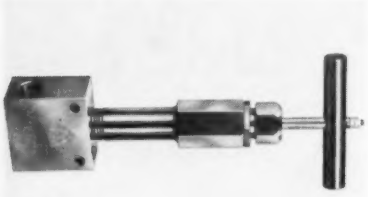
for off-highway vehicles, wheel- and track-laying tractors, loader graders, rollers, stationary power units and industrial drives. Han-

diing loads from 100-700 hp, the newcomers have torque multiplication ratios from 2.3:1-3.5:1. Sizes range up to 18-⅝in. diam. (Rockford Clutch Div., Borg-Warner Corp.)

For more data circle No. 27 on postcard, p. 153

Tubing Valves

Stainless-steel tubing valves suit extreme - temperature service. An



elongated stuffing box removes the packing from the hot zone in the valve body itself. The unit gives good service with gas or liquid at temperatures up to 1000°F, and pressures to 30,000 psi. Its two-piece stem doesn't rotate against the seat. This feature eliminates galling or scoring of either the seat or the stem. (Autoclave Engineers, Inc.)

For more data circle No. 28 on postcard, p. 153

Rapid-Transfer Screws

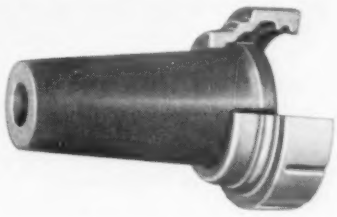
Here's a new line of rapid-transfer screws available in compact

sets consisting of case, wrench and six screws. Sizes range from #4 through 1 in. in both NC and NF threads. The screws have uniformly-machined points, and are carefully heat-treated for long life. Extra screws can be purchased separately. (Kay Products Co.)

For more data circle No. 29 on postcard, p. 153

Sand-Blast Nozzle

Single-piece construction gives this new ceramic blast nozzle a tight closure with all "B"-type holders. The simplified construction also means easier replacement and longer, more-even wear, because of

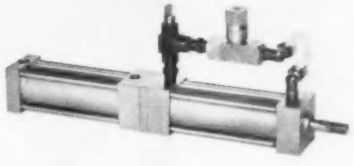


better alignment. And, you already have a long-wearing material to begin with. The high-alumina ceramic is second only to diamond in hardness. This extreme hardness increases service life and makes the nozzles almost unbreakable. (Diamonite Products Mfg. Co.)

For more data circle No. 30 on postcard, p. 153

Tandem Cylinders

New air-oil tandem cylinders are now available in ¾-, 1-, and 1.125-

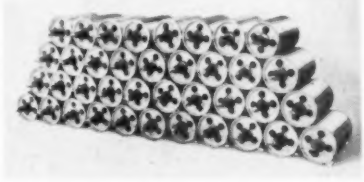


in. bores, and in eight mounting styles. Maximum pressure: 200 psi. They feature non-corrosive barrels, stainless-steel piston rods with lip-type rod seals, Delrin rod bushings, Teflon rod wipers and a choice of "O"-ring or lip-type piston seals. (Pneumatic-Hydraulic Development Co.)

For more data circle No. 31 on postcard, p. 153

All-Purpose Rolls

This complete line of carbo-nitrided steel rolls exhibit great re-



sistance to breakage and overall wear. They're particularly suited

Capacability means

Readiness

When it comes to refractories, *readiness* is Basic. You won't have to be "on guard" against slow shipments when you rely on Basic. Steelmakers know its eight plant network stands ready to supply a complete line of granular and tar-bonded refractories at the flick of a finger.

Supporting the company's main plant at Maple Grove, Ohio are other facilities in Ohio, Indiana, New York and Nevada. With the largest resources in the granular basic refractory industry, Basic has an annual capacity of well over a million tons.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

845 HANNA BUILDING
CLEVELAND 15, OHIO

Ready-Power switches to **Columbia-Southern Trichlor** to solve corrosion problem and save equipment in used motor degreasing

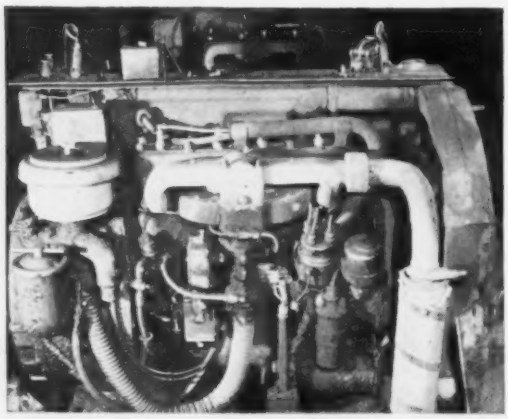
The Ready-Power Company of Detroit manufactures gasoline and diesel electric power units for fork-lift trucks, crane trucks, platform trucks and other materials-handling equipment. They also repair and rebuild used power units which have spent years in the most rugged kind of service. And this is where Columbia-Southern TRICHLOR comes into play.

The used power units, as received by Ready-Power, have been exposed to corrosive residues from fuel and lubricating oils, carbon black, salt, foundry dust, acid pickling materials and similar soils from virtually every type of industry. In service these contaminants build up a thick layer of grease and "gunk." Before Ready-Power's maintenance experts can diagnose and repair the units, the heavy coating of contaminants must go. A vapor degreasing operation proved to be the most efficient method of removing all soils down to the metal, without harm to any of the parts or surfaces.

Soon after installing the vapor degreasing system, though, Ready-Power ran into a problem. The solvent they were using soured rapidly, due to the combination of materials the used power units had picked up in their years of heavy service. In fact, the active acid content of the solvent built up so quickly that it was corroding the tank. In a short time, replacement of the new equipment might be required.

At this point, the Trichlor distributor in Ready-Power's area—Progressive Chemical Company of Detroit—teamed up with the maintenance and production people at Ready-Power to eliminate the source of equipment corrosion. Because Columbia-Southern Trichlor has a heavy-duty stabilizer system built into it for just such operating conditions, the degreasing system was charged with Trichlor and put into operation.

Result: The corrosion which threatened to cause equipment replacement stopped immediately and had never resumed since *neutral* Columbia-Southern Trichlor has been on the job. Units come clean—fast and economically—thanks to Trichlor and helpful service from Progressive Chemical, the distributor.



Ready-Power must remove this heavy accumulation of grease, dirt and acidic soil before diagnosing and repairing used unit. Degreasing is the answer to low-cost, safe cleaning of units returned for service.

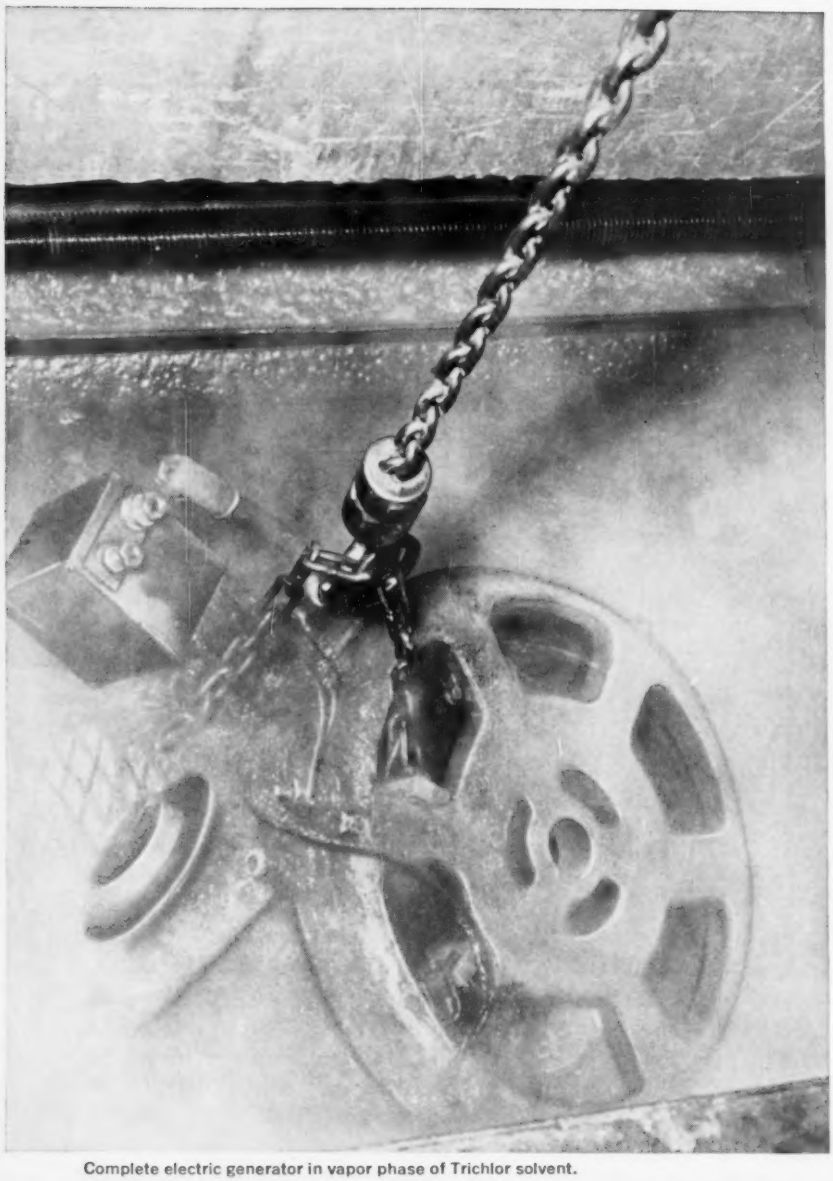
It's help like this, plus the consistently high quality of the product, that makes Ready-Power a steady user of Columbia-Southern Trichlor. Perhaps *your* operation could benefit, too. Why not call on your Trichlor distributor or the PPG Chemical Division office nearest you?

columbia | southern chemicals

CHEMICAL DIVISION

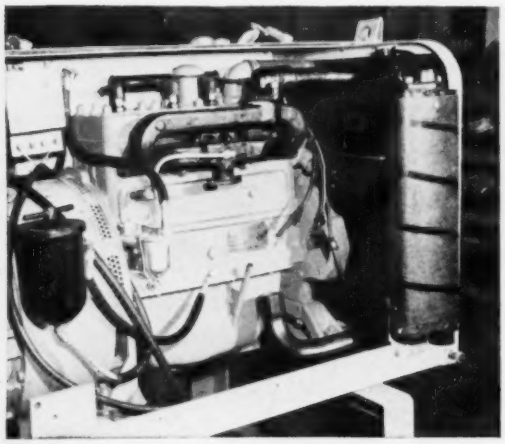
PITTSBURGH PLATE GLASS COMPANY

ONE GATEWAY CENTER PITTSBURGH 22, PENNSYLVANIA



Complete electric generator in vapor phase of Trichlor solvent.

Columbia-Southern Trichlor safely removes contaminants, yet protects the equipment with its heavy-duty neutral stabilizing system.



Rebuilt power units leave Ready-Power in first class condition; all defective parts repaired or replaced, and carrying the same warranty as new units.

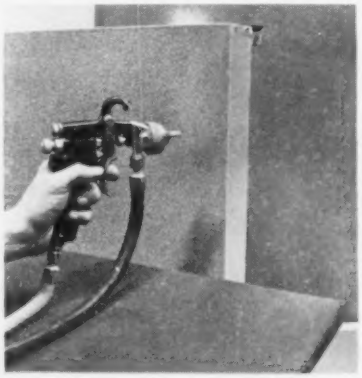
Peter Balysh (right) of Ready-Power, and Rodger Lau, Columbia-Southern Trichlor Distributor, inspect soil conditions on a unit turned in for repair.

for hot-runout service in steel mills. First, the rolls are machined. Then, they're carbonitrided in a large, controlled - atmosphere furnace. This treatment hardens the steel to depths of about 3/16 in. Immediate quenching after heat treating keeps distortion to a minimum. Before they leave the factory, the rolls are finish ground; but, this is kept to a minimum to avoid removing too much of the nitrided surface. (The Badall Co., Inc., a subsidiary of Tool Gear & Pinion Co.)

For more data circle No. 32 on postcard, p. 153

Vinyl Sprays On

New multi-color vinyl finishes spray on a wide variety of consumer, industrial and architectural products. A new system permits the application of the finish to products after fabrication. This eliminates the need for pre-laminated or pre-coated sheet metal. Savings usually result. And, since forming and welding are done before the finish is

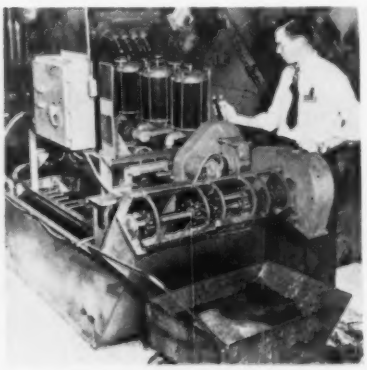


applied, you don't need to take any special care in fabrication. There are several cost saving advantages here. In the first place, inventory problems are simplified. There's no reason to stock coated metal. Different colors and textures are obtained just by changing the vinyl spray material. (Coatings Div., Metal & Thermit Corp.)

For more data circle No. 33 on postcard, p. 153

Back-Flushing Filter

A combination separator and back-flushing cartridge filter fits in with gun drilling, honing and lapping operations. It filters to 5 microns, in capacities of 20-50 gpm. The dirty coolant enters the separator, and by retarded movement



through overflow weirs, most solids are separated before the pumps send the liquid through the cartridges for filtering. The dirty, back-flushed liquid flows into a conveyor-equipped seeper tank. From there it slowly flows through small holes to a settling tank where it is held

ANOTHER ULTRASONIC FIRST...

THICKNESS GAGING WITHOUT CONTACT

Tube scanner for VIDIGAGE® thickness gaging without contact.

Thickness gaging by means of the ultrasonic resonance technique can now be accomplished by immersion without contact. This is extremely advantageous because:

- it eliminates transducer wear
- maintains uniform coupling of energy between transducer and work surface (this in turn makes the test more reliable!)
- avoids possible damage to work surface caused by transducer contact
- substantially increases inspection speeds

When the water column is of sufficient length the VIDIGAGE® does not respond to the water resonances. As a result the resonance thickness of the work piece can be detected by itself on the VIDIGAGE screen.
In order to take full advantage of this immersion system, the VIDIGAGE had to be modified. The modified VIDIGAGE then surpassed all expectations, especially in the gaging of small diameter, high accuracy tubing.

This development is another in the long line of BRANSON engineering breakthroughs, which enables industry to solve its problems by means of ultrasonic testing. The next time you have a testing problem call BRANSON and see how fast BRANSON will find the best solution in the shortest possible time.

SINCE 1946 — THE RESPECTED NAME IN ULTRASONICS

BRANSON INSTRUMENTS, INC.

Ultrasonic Test Division
23 Brown House Road, Stamford, Conn.

8-20 hr, or until the solids settle. The liquid then overflows to the pump section for recirculation. Conveyors in all sections remove solids to the tote box. (Henry Mfg. Co.)

For more data circle No. 34 on postcard, p. 153

Space-Saving Relay

Designed for the automated machine-tool industry, a new relay saves up to 50 pct in control-panel space. Naturally, this means more floor space for machine-control equipment. The newcomers are available in any combination of normally-open or normally-closed contacts. Rated full-load current is 6 amp at 300-v ac. One of the first major installations of the units

is in the control panel of an automobile-engine transfer line. In this application, use of the relay saves 40 sq ft of manufacturing floor space. As originally planned, the control panel was 35 ft long. But with the new relays, the redesigned panel is just 20 ft long. (Westinghouse Electric Corp.)

For more data circle No. 35 on postcard, p. 153

Dressing-Wheel Tool

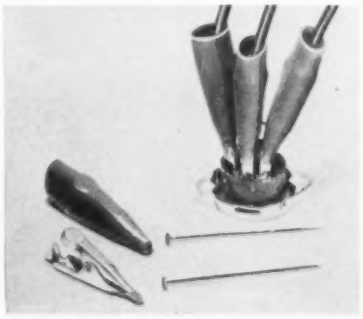
Production problems often arise when a work-piece finish must be consistently held within a microfinish range, without sacrificing other tolerance limitations. For instance, the stem diameter of an automotive exhaust valve usually has an oil-retention surface specified, rather than "18 rms or better." Production engineers recognize the shortcomings of mirror-smooth finish on these units. Their problem is finding a feasible method of dressing grinding wheels to hold a rough finish without deviating from the limits on straightness and roundness. These diamond-set, rotary

tools may be the answer. Company engineers say that the tool, traversing at regular intervals across the face of a grinding wheel, can maintain a specific finish on the work piece within a range of 30 to 55 rms. At the same time, it holds a taper-free straight surface within 0.0002 in., and roundness of the part diameter within the same limits. (Wheel Trueing Tool Co.)

For more data circle No. 36 on postcard, p. 153

Tiny Electric Clip

Insulator and all, the business end of this inch-long electric clip is no larger than a pin head. Thus, it fits the closely-spaced terminals found on printed circuits. Certainly this is in line with the space-age trend towards miniature components. The clips are made of cad-



mium-plated steel or solid copper. And for easy identification, the insulators come in different colors. (Muller Electric Co.)

For more data circle No. 37 on postcard, p. 153

Portable Tool Mount

A portable, ball-bearing-supported tool mount suits all standard models of an automatic screwdriv-

Capacability means

Savings

When it comes to gun refractories, *saving* is Basic. You can "sock away" time and money with Basic's BRI GUN and gun refractories such as GUNDOL and GUNMIX . . . keys to easier, faster, less costly furnace maintenance.

Electric furnace operators report that GUNDOL, GUNMIX and GUNMAG for routine maintenance of sidewalls doubles lining life and, in many cases, cuts refractory costs in half. Shooting open hearth frontwalls, backwalls and skewbacks with GUNCHROME-M produces similar savings.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

845 HANNA BUILDING
CLEVELAND 15, OHIO

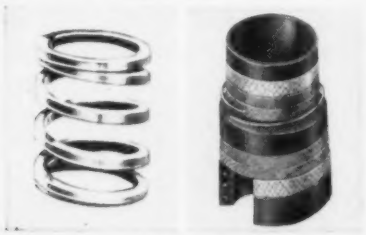
The Porter Alloyist delivers the right alloy IN THE SPOTS THAT COUNT

There can be no compromise for instant, reliable communication when disaster strikes. That's why the Porter Alloyist recommends phosphor bronze and other special alloys for telephone and switchboard components. Contact springs and other vital parts made from these alloys deliver high electrical conductivity and resist deformation after repeated use.

THE PORTER ALLOYIST IS A SPECIALIST IN A WIDE RANGE OF SPECIAL METALS

Porter's Riverside-Alloy Metal Division is your single reliable source for specialty alloys in 8 basic groups of wire, rod and strip . . . phosphor bronze, nickel silver, cupro nickel, brass, stainless steel, nickel, Monel and Inconel.

Ask for a free copy of "Alloys for Industry" describing our wide range of specialty alloys. Write H. K. Porter Company, Inc., Riverside-Alloy Metal Division, Riverside, N. J. Or contact our sales offices in Hartford, Chicago, East Orange, Atlanta, Cleveland, Detroit, Cincinnati, Los Angeles, and Rochester.



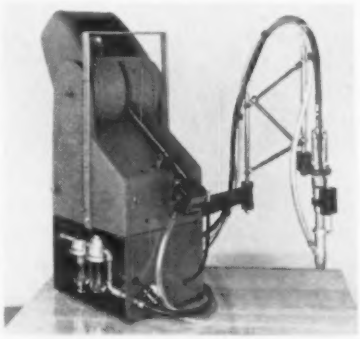
PORTER supplies stainless steel, "K" Monel and Inconel "X" wire for many types of springs.

PORTER carbon steel wire reinforces and lengthens the life of a wide range of industrial hose.

PORTER

RIVERSIDE-ALLOY METAL DIVISION
H. K. PORTER COMPANY, INC.

ing system. It moves laterally at the slightest touch. It's designed to hold the tool in a vertical position at all times, with no side pull. This elimi-



nates the possibility of cross threading when driving screws into pretapped holes. (Clyde Engineering & Mfg. Co.)

For more data circle No. 38 on postcard, p. 153

Plastic Protectors

A new general-purpose line of plastic protectors suits all threaded and non-threaded parts, in a range from ¼-2¼ in. Usable as a cap or plug, they eliminate special sizes and reduce inventories. The protectors are made of tough elastic polyethylene to provide complete pro-

tection for parts during shipping, storage and manufacturing operations. (S. S. White Industrial Div.)

For more data circle No. 39 on postcard, p. 153

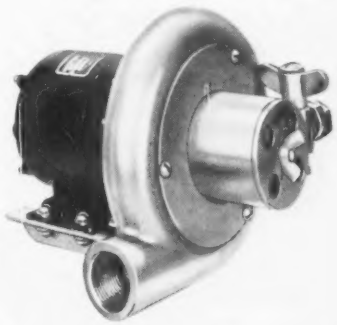
Direct-Action Gages

Designed for accurate service and long life, a new line of compact hydraulic gages is calibrated in four pressure ranges. The rugged units operate on the direct-action principle. But, the spring-loaded, pressure-sensing mechanism is protected from shock damage and overloads by a built-in damping device. In addition, a positive stop in the indicating mechanisms insures continued accuracy, even when it's used on hydraulic systems and other machines famous for being tough on gages. (A Schrader's Son, div. of Scovill Mfg. Co., Inc.)

For more data circle No. 40 on postcard, p. 153

Mixes Air and Gas

For small industrial heating applications, a fan-type mixer produces an air-gas mixture and delivers it under pressure to a burner or a series of burners. It's ideal where a blast pilot is desired and there is no other source of air pressure available. Less than 6½-in. diam, it suits firing installations requiring



inputs up to 215,000 Btu per hr. It fires at a fixed rate; or, an automatic on-off control can be provided by installing a solenoid valve in the gas line feeding the mixer. (Eclipse Fuel Engineering Co.)

For more data circle No. 41 on postcard, p. 153

Toggle Clamp

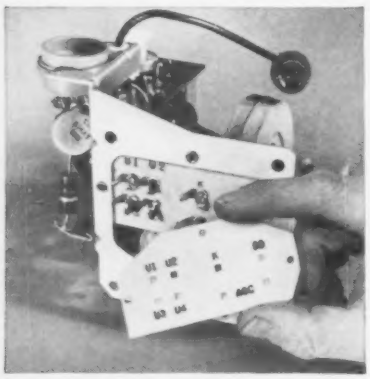
Weighing only 15 oz, a new, hold-down toggle clamp has a holding pressure rated at 800 lb. It attaches to the sides of conveyors or containers, or to the edges of lids or covers. This is done by welding. (Detroit Stamping Co.)

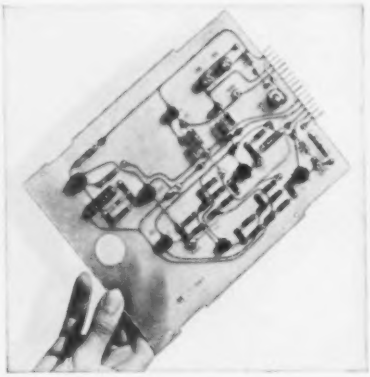
For more data circle No. 42 on postcard, p. 153

Reduces Friction

Reinforced Teflon inserts in a line of stainless-steel bushings reduce shaft friction. Thus, less torque

Taylor glass-base laminates pop right out as design materials in many applications

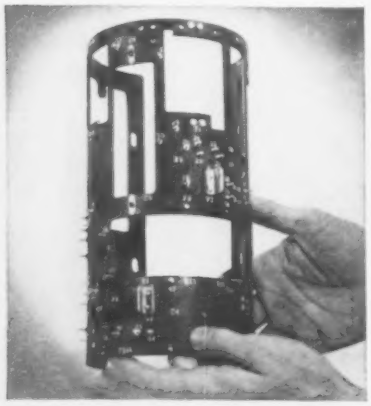




There are good reasons for investigating Taylor glass-base laminated plastics as high-strength-to-weight materials in your design. They offer light weight, corrosion resistance, electrical and thermal insulation, and ease of fabrication.

For example, glass-fabric-base laminates have the highest mechanical strength of all laminated plastic materials. They have been successfully used in the fabrication of critical parts, including aircraft parts and bases for printed circuits. They are most valuable where extremely low moisture absorption, increased heat resistance and superior electrical properties are required.

Taylor Fibre produces a number of different glass-base grades in sheet, rod and tubular form, and copper-clad. Those with phenolic resin are recommended for mechanical and electrical applications requiring heat resistance. Those with melamine are characterized by their excellent resistance to arcing and tracking in electrical applications. They also have good resistance to flame, heat and moderate concentrations of alkalis and most solvents. Those with silicone exhibit very high heat resistance, combined with good mechanical and electrical properties. They also have highest arc resistance. Those with epoxy offer extremely high mechanical strength, excellent chemical resistance, low moisture absorption, and high strength retention at elevated temperatures.



Technical data about these and other Taylor laminated plastics are available. Ask for your copy of the Taylor Laminated Plastics Selection Guide. Taylor Fibre Co., Norristown 52, Pa.

Taylor
LAMINATED PLASTICS VULCANIZED FIBRE

DESIGN DIGEST

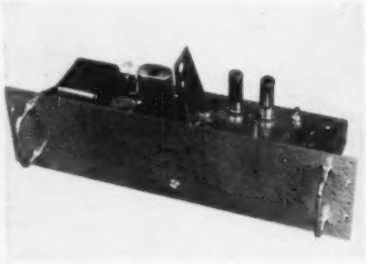
is needed to actuate the shaft. The inserts are permanently bonded to the ID of the bearings. The bear-

ings themselves particularly suit liquid-fuel or exotic-fuel applications. Another important design feature is the encapsulated glass cloth in the Teflon. This increases wear and virtually eliminates cold flow. (The Fluorocarbon Co.)

For more data circle No. 43 on postcard, p. 153

Servo Amplifier

Here's the newest addition to a line of pre-engineered standard components for use in servo systems. The compact unit includes a built-in, regulated power supply. Requirements are 115-v ac at 1 amp. Controls include: Balance, gain, dither and equalizer. Plug-in type, electrical connections facilitate



application and maintenance. (Vickers Inc., a div. of Sperry Rand Corp.)

For more data circle No. 44 on postcard, p. 153

Heating Elements

New furnace heating elements suit laboratory crucible furnaces. The units mount vertically, so that

small crucibles may be raised or lowered into them. Or, you can mount the element horizontally with connections at the rear leaving free access to the tube mouth. Alternately, the element may be lowered over the work should the process demand it. The reason for this versatility lies in the element's unusual construction. It has a 3-in. OD with a double-spiral hot zone. Both electrical connections are at one end. (Morganite, Inc.)

For more data circle No. 45 on postcard, p. 153

Photovoltaic Cells

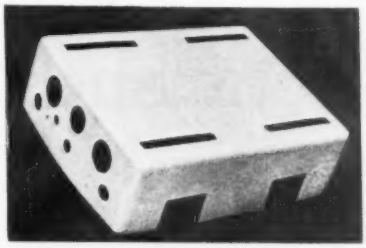
These encased photovoltaic cells provide high output, even under adverse atmospheric conditions. Various sizes and models are available. All models incorporate a new selenium cell. This unit features linear output with increased illumination throughout a wide range. In addi-

tion, there's high sensitivity beginning at low light levels, long-term stability, and resistance to shock and vibration. Both models resist the two most serious hazards to any barrier-layer cell — moisture and chemical attack. (Daystrom, Inc., Weston Instruments Div.)

For more data circle No. 46 on postcard, p. 153

Metal Undercoating

The development of a new organic undercoating upgrades the durability of thin, heat-reflective metallic coatings. It's a modified silicone that you can spray. Once it's sprayed on materials and parts, it provides a smooth, adherent surface for vacuum deposition of the gold and aluminum coatings. The undercoating also acts as a barrier against diffusion of the coating met-



al into the base metal. Other benefits are an improved coating gloss, better weather resistance and high heat resistance. (Swedlow Inc.)

For more data circle No. 47 on postcard, p. 153

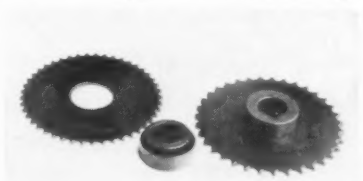
Holds Machining Tools

For single-spindle, automatic screw machines, a 5/8-in., dovetail-form-tool holder fits both front and rear slides. In use, it's quick to set up. And, it's quick to return to the screw machine after sharpening the dovetail form tool because a scale aligns the cutting edge with the centerline of the production part. Little or no adjustment is normally required. This keeps downtime to a minimum. Often, removing only 0.01 in. adequately sharpens the tool. This greatly increases tool life and affects additional savings. (The Royal Machine & Tool Corp.)

For more data circle No. 48 on postcard, p. 153

Sprockets and Hubs

Precision, die-cut sprockets and hubs feature a new design and construction. Because of the innovations, the plate sprockets convert to hub sprockets. These sprockets suit both high- and low-speed ap-



plications. In addition, they're chamfered on both sides. This assures trouble-free operation when they're used with roller-chains. (Dayton Rogers Mfg. Co.)

For more data circle No. 49 on postcard, p. 153

Capacability means

Convenience

When it comes to ramming refractories, *convenience* is Basic. And, it pays to let Basic's magnesia ramming refractories, RAMSET and RAMICLASE, be your "ace in the hole" when schedules are tight. For quick, dependable bottom installations, they can't be beat.

In the 20 years since their introduction, RAMSET and RAMICLASE have become the standard of comparison for open hearth and electric furnace bottoms. For the best possible job, Basic furnishes special mixers, conveyors, rammers and other equipment to speed installation and reduce labor costs.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED

845 HANNA BUILDING
CLEVELAND 15, OHIO

New Equipment and Machinery

Measuring Machine Gages X and Y Coordinates

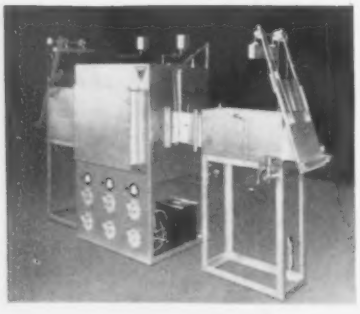
This versatile machine supplies fast, precise measurements. It finds the location of holes and surfaces in two dimensions. But, in contrast to tedious checking on surface plates, lighted numerals display the X and Y coordinates simultaneously. This means reliable results. It also speeds the work. All the operator must do is record the direct digital readings. Then, he adds or subtracts to get the answer. But, that's not the whole story. When you substitute a scribing tip for the probe, the unit doubles as a layout machine. Accuracy of ±0.001 in. is guaranteed. (The Sheffield Corp.)

For more data circle No. 50 on postcard, p. 153

Friction Welder Boasts High Speed, Low Pressure

An efficient new machine welds by friction. Basically, it's a simple process. Friction converts the mechanical energy of two contacting, rotating objects into thermal energy. In practical terms, the technique consists of holding one object fast, while the other rotates and presses against the first. After a specified period of time, the rotation stops. Then, pressure increases. This condition is held for another specified period. Despite this simplicity, friction welding handles a vast range of materials, even ceramics and plastics. In many cases, it eliminates the need for fluxes and special gaseous atmospheres. (American Machine & Foundry Co.)

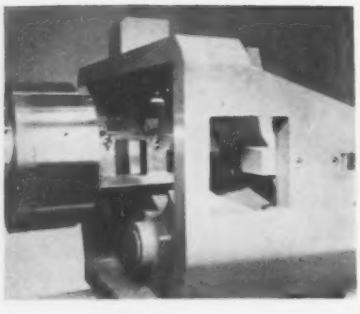
For more data circle No. 51 on postcard, p. 153



Heat-Treating Furnace Excels on Critical Jobs

Those performing critical heat-treating processes, such as reducing tungsten-oxide powder to pure tungsten metal, will find this electric furnace of special interest. It's a 3-zone, straight-line unit, designed for a hydrogen atmosphere. There's a pre-heat zone, a central high-temperature zone and a water-cooled exit zone. Both entrance and exit ends have counter-balanced, sliding-plate doors. A solenoid operates the flame curtain. To guard against protective-atmosphere loss, interior blast gates separate the entrance area and the exit area. (Pereny Equipment Co., Inc.)

For more data circle No. 52 on postcard, p. 153

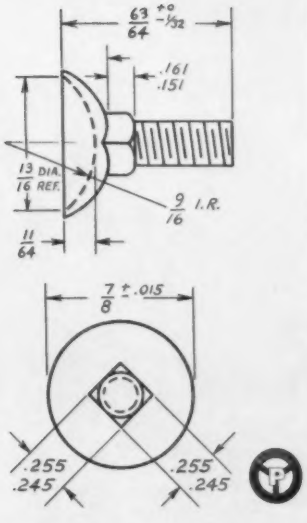


Boring Machine Has Straight-Forward Cycling

With exceptionally rugged fixturing, a precision boring machine holds tolerances of 0.0005 in. on a 25-in. planet-pinion carrier. To start the cycle, the operator crane loads a component into the fixture. Then, he hand clamps it. The machine table moves to the left, and the boring quill enters the workpiece as the facing head finishes two faces. At the end of this stroke, the two boring tools are ready to bore the bearing diameters. The facing head returns in feed and faces another surface. Once this is done, the head clears the component from the machine. (Ex-Cell-O Corp.)

For more data circle No. 53 on postcard, p. 153

Exclusively headed from KEYSTONE WIRE



Pheoll Manufacturing Company, Inc.

Swivel base for truck rear view mirror passes toughest tests before it hits the road!

Pheoll Manufacturing Company, Inc., Chicago, Illinois, assigned to produce the square-shouldered cup screw shown here, asked Keystone Steel & Wire Company for the exact cold heading wire. Keystone's Metallurgists developed double extrusion coated special processed quality wire.

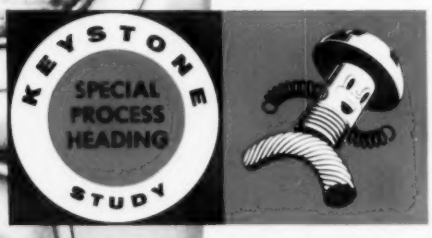
Finished product specifications called for a uniformly smooth cupped surface, free of burrs for proper adjustment of the mirror. This is consistently achieved by Keystone Wire's quality control during every step of wire manufacture from open hearth steel making to finished wire.

Because this cup screw must withstand the rigors of the road, it is given the toughest tests to check head stress and ductility. Held in a vise, the shank is struck repeatedly until it is bent 90° without fracture. The cup portion gets similar treatment.

The success of this cold-headed square shouldered cup screw is due to the superior *flowability* of Keystone Special Processed Wire, another example of proper chemical analysis, correct thermal treatment and consistent uniformity throughout every coil.

Why not take advantage of the service offered by Keystone Metallurgists who will analyze your specifications and recommend the wire just right to solve your particular wire problems? Talk with your Keystone Representative for complete details, or write us, sending your part and blue prints, if possible.

Keystone Steel & Wire Company, Peoria, Illinois



KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.

Before You Buy or Specify—

COMPARE

DIE CAST ZINC
With Other Materials

	ZINC ASTM XXIII SAE 903	ALUMINUM ASTM S12B SAE 305	PLASTIC (DELRIN*) *Delrin is a registered trade name of E. I. du Pont de Nemours & Co. (Inc.)
TENSILE STRENGTH	41,000 p.s.i.*	39,000 p.s.i.	10,000 p.s.i.
IMPACT STRENGTH	43 ft.-lb.*	2.0 ft.-lb.	1.4 ft.-lb.
SHEAR STRENGTH	31,000 p.s.i.	25,000 p.s.i.	9,510 p.s.i.
COEF. OF THERMAL EXPANSION PER °F	.0000152	.000011	.000045
MELTING POINT °F	727.9°	1080°	347°

***ZINC DIE CASTINGS HAVE BEEN TIME-PROVEN**

• After ten years of aging, the Tensile Strength of the Die Cast Zinc alloy is 35,000 p.s.i. and its Impact Strength is 41 ft.-lb. Because of the newness of Delrin, its ability to retain mechanical properties is unknown. Data in table above pertaining to Delrin is from the manufacturers own literature.

Another point to keep in mind—as a metal, Zinc has a hard surface and is less subject to scratching than plastic. Furthermore, it can be beautifully finished by plating.

For proven durability, specify Zinc.

ST. JOSEPH LEAD CO.

250 Park Avenue
New York 17, N. Y.

ST. JOE **99.99+% ZINC**

ZN-1738

Weighs Rail Cars

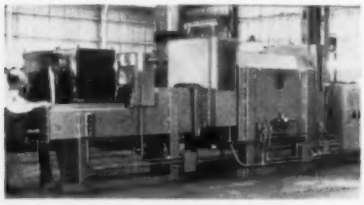
An electronic weigher balances and prints out the weight of rolling rail cars in less than three seconds.

At the heart of this weighing-in-motion system is an electronic weight sensor. It solves the vibration problem that was the bugaboo of mechanical systems. Here's what happens. Strain-gage load cells pick up vibration frequencies caused by the cars' rolling movements and by flat spots on the car wheels. Damping devices, applied to the electronic amplifiers, effectively shut off these unwanted signals. Thus, the machine prints the correct weight. The system weighs as little as 60 lb, by 0.1-lb increments, or as much as 400 tons, in 200-lb increments. (Fairbanks, Morse & Co.)

For more data circle No. 54 on postcard, p. 153

Indexing Box Furnace

Molybdenum heating elements provide high-temperature, low dewpoint operation in a new type of

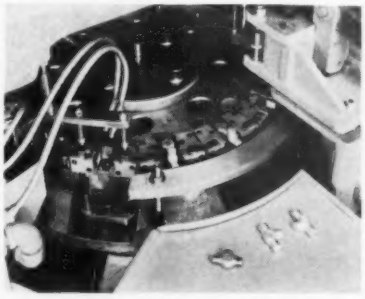


automatic-indexing box furnace. The furnace bright coats stainless steel in a hydrogen or dissociated-ammonia atmosphere. Designers estimate, that under normal conditions, the units should require no major maintenance work for at least 10 years. Also, the new furnace saves considerable space, since there are no mechanisms extending beyond the charge or discharge tables. It operates at temperatures up to 2350°F. Dewpoint can be held down to −60°F, because of the insulating-firebrick construction of the heating chamber, backed by high-purity insulation. This eliminates the need for an expensive alloy muffle. (General Electric Co.)

For more data circle No. 55 on postcard, p. 153

Machines Castings

A double-wedge fixture centers and clamps small ferrous castings for drilling, threading, tapping and hollow milling on a new dial-type machine. This means more operations with the same tooling. For instance, three different valve-body castings can be machined without



tool changes. All you have to change are the serrated clamping jaws. Parts run through the machine twice. The first pass machines one horizontal lug and the vertical lug. The part is then run through again to machine the other horizontal lug and deburr the vertical hole. After machining, a stream of coolant ejects the parts and washes the fixture. (The Bodine Corp.)

For more data circle No. 56 on postcard, p. 153

Openside Miller

For production work as well as everyday shop jobs, a compact, openside milling machine features low initial cost. Available in 30-, 36- and 42-in. basic sizes, the new miller provides the solution to most milling situations, since any combination of rail and/or side heads

Capacability means

Dependability

When it comes to furnace maintenance refractories, *dependability* is Basic. You won't need the "Alpine Rescue Squad" if you rely on Basic's dead-burned dolomites, MAGNEFER and SYNDOLAG. For more than 40 years steelmakers have known these products as the standard of comparison for heat-to-heat furnace repair.

MAGNEFER and SYNDOLAG provide better bonding, greater density and higher heat resistance. Used in virtually every open hearth and electric steelmaking shop in the country, MAGNEFER and SYNDOLAG give you more advantages, more for each of your refractory dollars.

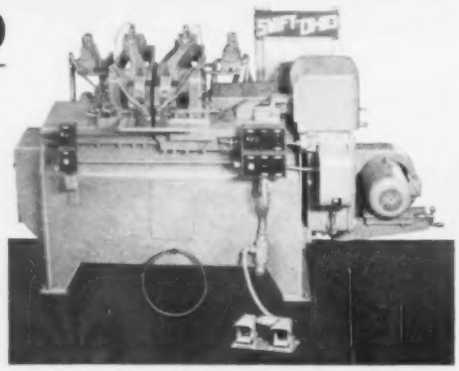
If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

High Production WELDERS by SWIFT OHIO

Dependable—Reliable

FULLY AUTOMATIC



SWIFT OHIO No. 25 Flash Welder—designed for fully automatic production welding of automotive gear rings. Clamp fixtures align both ends of ring in a single motion. Rated 150 KVA.

SWIFT OHIO offers the only high speed production welding machines that provide for positive independent adjustment and alignment of electrodes—up—down—front or back.

The SWIFT OHIO Resistance Welder line is complete—proven through more than 35 years of service to the metal working and fabricating industry.

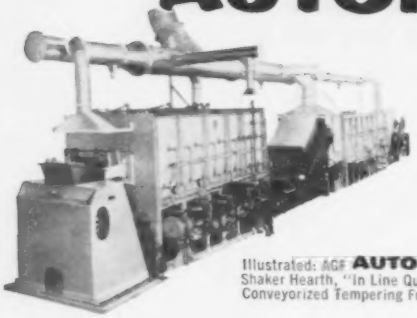
Whatever your welding needs—or problems—SWIFT OHIO can serve you. We invite you to contact us for complete information.

SWIFT

SWIFT OHIO CORP. • KENTON, OHIO

MULTIPLE-OPERATION EQUIPMENT FOR WELDING, MACHINING, ASSEMBLY, SPECIAL MACHINERY

AGF AUTOMOTION



Illustrated: AGF **AUTOMOTION** Shaker Hearth, "In Line Quench", and Conveyorized Tempering Furnace.

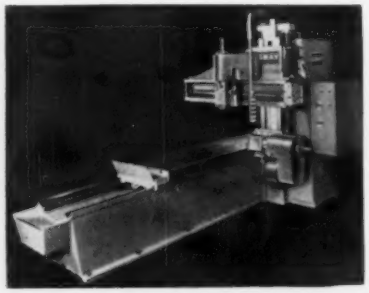
AUTOMOTION best describes AGF's unique automatic heat treating furnaces . . . both Reciprocating Hearth and Rotary Retort . . . employing the "Work in Motion" principal that assures uniformity of case and hardening.

AGF's **AUTOMOTION** Furnaces operate **wholly automatically** and **continuously,** and are easily placed in any continuous or intermittent production line.

Send for catalogs and details of models to meet your specific needs

AMERICAN GAS FURNACE CO. 1004 LAFAYETTE STREET, ELIZABETH, N.J.

is possible. Here are some of its interesting features. Milling heads square lock to the rail on non-metallic bearing ways. This assures ri-

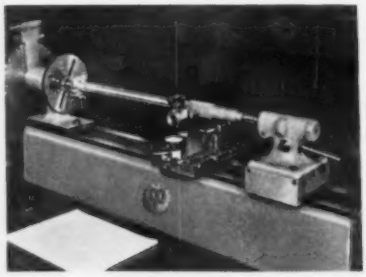


gidity for carbide milling. A 10-hp, fan-cooled motor drives the spindle, a planetary-gear system which is self-oiled. Eight speeds are available from 67-652 rpm. (The G. A. Gray Co.)

For more data circle No. 57 on postcard, p. 153

Determines Errors

A simple tooth-space system also graphically helps identify causes of tooth-spacing errors. It does this for straight or helical gears and splines. It measures pitch-line run out and eliminates its effects on an index check. What's more, the inspection can be made without a highly-trained man. A very short session on the system technique enables the average machine operator to



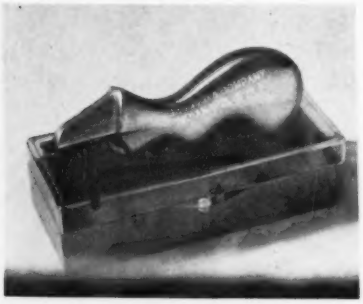
check toothed parts and accurately determine tooth - spacing errors. (Michigan Tool Co.)

For more data circle No. 58 on postcard, p. 153

Burrs and Sharpens

A new burring and sharpening tool boasts carbide-insert blades and a camming feature that advances the edges to compensate for

wear at the blade intersection. The standard tool edge burrs sheet metal, plastic or glass up to 1/16-



in. wide. Special tool blades are available for larger sizes. It also sharpens most other blades. (Crodian & Co.)

For more data circle No. 59 on postcard, p. 153

Crucible-Pot Furnace

With an atmosphere retort and a forced-air cooling pit, a new electric, crucible-pot furnace produces semiconductors, solid state and other electronic devices. It's also ideal for glass to metal sealing and heat treating metals in a protective atmosphere. Maximum chamber temperature is 2250°F. It's 7-in. deep with a 7-in. diam. The atmosphere retort has a clear working area of 4½-in. diam x 6½-in. deep. It operates up to 2150°F. Rapid cooling of the re-

tort results from a non-insulated, forced-air cooling pit. (Lindburg Engineering Co.)

For more data circle No. 60 on postcard, p. 153

Electric Hand Grinder

Offering unlimited grinding possibilities, a Swiss-made hand grinder particularly suits die castings, stampings and tooling. It has a continuous power input of 250 w. This produces spindle speeds of

25,000 rpm at no load, and 15,000 rpm under load. Grinding wheels up to 1-in. diam may be used. (Victor J. Krieg, Inc.)

For more data circle No. 61 on postcard, p. 153

Threading Lathe

An extra-long, automatic-threading lathe offers an 80-in. stroke with 84 in. between centers. As an example of what this means, the new machine threads a 6½-ft lead screw in less than 30 minutes. It threads automatically, internally and externally, by a series of passes in which the spindle speeds, feeds and number of

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

Build in CANADA . . . for your Canadian market

We solicit your enquiries on
light, medium and heavy industrial equipment
for contract manufacture.

Write or Call: James F. Hepburn
Vice-president

612

John T. Hepburn, Limited

914 Dupont St. . TORONTO, CANADA - LEnnox 4-8871

contract machine builders
machine tool builders
overhead crane builders
gray iron founders
steel fabricators

Since 1905

Hepburn TORONTO CANADA

NEW OSBORN POLISHING/BUFFING LATHES . . . these compact, variable speed lathes are Osborn-engineered to handle your work economically at highest efficiency. Available with balanced single or double spindles, fixed or variable speed ranges from 600 to 3600 rpm. Variable speed lathes have 3-to-1 speed range. Choice of 3, 5 or 7½ hp motors. Other features include: motor-mounted magnetic disc brakes for instantaneous spindle stopping. Roto-Cone drive for instant, vibration-free power transmission and speed changes.

FREE BULLETIN 620 includes complete specifications, operating and construction details plus application data. For your copy, write or call *The Osborn Manufacturing Company, Dept. F-110, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

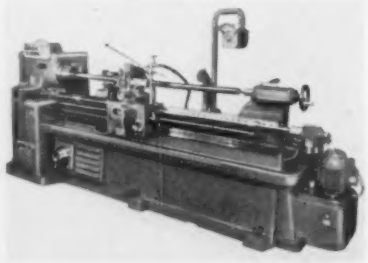
VISIT OUR BOOTH '61 ASTME TOOL EXPOSITION COLISEUM NEW YORK MAY 22-26

Booth 2407

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

passes are preselected. When the cycle is complete, the machine stops automatically. With additional at-



tachments, tracing, turning, cutoff, chamfering, boring and threading are all possible—in a single operation. (Man-Au-Cycle Corp. of America)

For more data circle No. 62 on postcard, p. 153

Eliminates Distortion

Newly introduced to the American market is a distortion-free pneumatic press. The French-made unit has independent control of the up and down strokes. It delivers a powerful, yet delicate, action that squeezes the work without any im-

pact. The press suits small metal parts. (Howard International, Inc.)

For more data circle No. 63 on postcard, p. 153

Welds Automatically

The automatic welding of large-diameter, transmission-line pipe in the field is now possible with a new welding machine. And, you don't need to rotate the pipe. The machine employs the gas-shielded-arc

process, using CO_2 gas. Welding current is low, usually 120-150 amp, dc, reverse polarity. Thus, it works with a low arc voltage in the neighborhood of 19-20v, and with small-diameter electrode wire. Preliminary procedure resembles that for conventional manual welding. Two beveled pipe ends are lined up with a standard gap and firmly held by a line-up clamp. Then, the compact machine can be positioned over the joint by two men or for field convenience, by a side-boom tractor. The operator visually lines up the unit over the joint, and adjusts the electrode position with the

pendant control. The weld is visible at all times. Even though the operation is fully automatic, the operator can control both unit and welding head to compensate for variables. (Hobart Brothers Co.)

For more data circle No. 64 on postcard, p. 153

Flash Welds Bar

Heavy-duty electrical and mechanical arrangements permit flash welding aluminum to copper bar stock with a new flash welding machine. The work is preheated, flashed, and upset automatically. The resulting welds, produced in a matter of seconds, can withstand 180° bend tests. Rated as a 400-kva machine, at a 50-pct duty cycle, the welder backs this up with heavy-fabricated steel frame. Platens, dies and electrodes are at table height, convenient to the operator. (Thomson Electric Welder Co.)

For more data circle No. 65 on postcard, p. 153

Safe Vacuum Lift

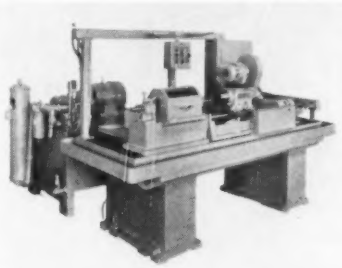
Many safety features protect the operator of this new vacuum-lifting unit. A rigid handle, with control, keeps him always away from the load. Indicators assure him that

the unit is ready for a safe lift. Should the power fail, safety tanks will hold the load. The model in the photo is rated at 1340 lb. It lifts stone, aluminum, steel or concrete slabs. For further safety, a filter removes dirt from the system. (Airlock Mfg. Co.)

For more data circle No. 66 on postcard, p. 153

Fixed-Bed Gun Drill

Designed for production drilling of deep precision holes in ferrous or non-ferrous materials, a new, fixed-bed gun drill offers a self-contained hydraulic feed or a lead-screw-feed, gun-drilling unit. Also available is a high-pressure coolant system with



a 100-gal capacity. It supplies a closely-controlled supply of clean oil. (Leland-Gifford Co.)

For more data circle No. 67 on postcard, p. 153

Dewpoint Control

With a new endothermic generator, the rule is full-rated generator output in the minus-dewpoint range. This performance should benefit

Capacability means

Reliability

When it comes to refractories, *reliability* is Basic. You won't have to "walk a tightrope" during peak or emergency periods; steelmakers know they can depend on Basic. Its 40-year record of uninterrupted shipments is unique in the refractory industry and a valuable plus when reliability counts.

Served by two leading railroads, Basic's Maple Grove, Ohio plant ships around-the-clock — getting steelmaking refractories where they're needed . . . fast. To support rail transportation, extensive truck facilities are available for short hauls and emergency shipments.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

IN THE VACUUM MELTING FIELD . . .

LET'S MAKE NO MISTAKE ABOUT IT . . .

QUALITY — the manufacturing or fabrication of vacuum furnaces, vacuum crucibles and ingot molds are **not ordinary metal working jobs.** Quality depends on . . . .

EXPERIENCE — a good product in the vacuum melting field depends on 'know-how' gained through years of experience. Our quality gained by experience gives us . . . .

VERSATILITY — to quote on **furnaces, crucibles and ingot molds** of any design, plus an engineering department able to help in planning.

If you want —
Quality — Experience — Versatility
Call, Troy — ARsenal 3-3912

ZAK MACHINE WORKS INC.
TROY (GREEN ISLAND) N. Y.

NEW EQUIPMENT

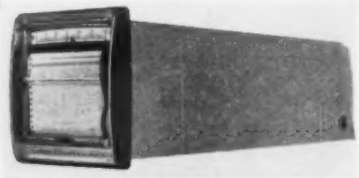
metallurgists and production men dealing with complex heat-treating and sintering problems. New silicon-carbide heating elements permit operation up to 2000°F. This assures complete heat penetration of the retort, even at full-rated capacity. Also, the constant resistance of

the ceramic elements eliminates the need for expensive tap transformers. (C. I. Hayes, Inc.)

For more data circle No. 68 on postcard, p. 153

Telemeter System

Unlike an electro-mechanical type, this all-electronic telemetering system has few moving parts; no mechanical cam followers, no clutches and no mercury switches. The standard cycle is only two seconds. The transmitter features a photo-diode detector which scans input position in relation to a cam that's etched on glass. Then it operates dry-switch contacts in the



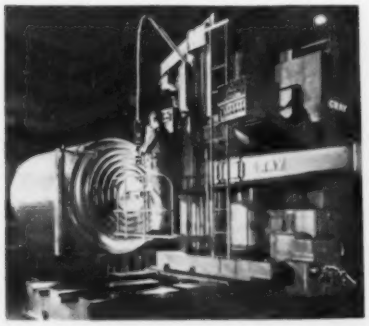
transmission system. There is no contact, hence no friction, between input arm and cam. (The Foxboro Co.)

For more data circle No. 69 on postcard, p. 153

Profitable Short Runs

By eliminating costly tooling and permitting fast changeover from one job to the next, a new boring, drilling and milling machine provides

opportunities in previously unprofitable or complex work. Teamed up with a readout numerical control, it



makes short runs practical and profitable. The control system offers progressive steps to full tape control. Its readout provides a basic and infallible counting or measuring system. And, the zero-offset feature establishes zero readout at any predetermined reference point on the workpiece. Drawing dimensions can be seen on the readout panel. (G. A. Gray Co.)

For more data circle No. 70 on postcard, p. 153

Grinds at High Speed

New, lightweight grinders speed production and ease operator fa-

tigue. The high-speed tools have free speeds of 6000, 9000, 12,000 and 15,000 rpm for rapid finishing operations. An improved muffler design keeps the noise level down. Also, a sensitive, weight-type governor assures positive and accurate speed control. For long tool life, there's a built-in lubrication system and an air strainer to keep foreign particles out of the motor. (Ingersoll-Rand Co.)

For more data circle No. 71 on postcard, p. 153

Electroplating Unit

Ideal for experimental or short-run plating and anodizing, a new unit reverses polarity at the flip of a switch. The electroplater handles

Custom-Engineered
Overhead Electric Traveling
Cranes in Capacities to
150 Tons. Write for Bulletin 5000B.

Material Handling Division
CONCO ENGINEERING WORKS, INC.
Mendota, Illinois

AFFILIATES: Spartan Tool Division—Powered Sewer Cleaning Equipment • Field Control Division—Barometric Draft Controls • Conco Building Products, Inc.—Brick, Tile, Stone

NEED TUBING?

We have it in stock!

CAR

More than 2500 sizes, shapes and grades of steel and aluminum tubing are carried in our stocks available for immediate shipment.

In addition we can furnish mill quantities of tubular items for standard and special applications.

Seamless and Electric Welded
Cold Drawn Butt Welded
Hydraulic Pressure Tubing
Squares and Rectangles
Stainless Tubing and Pipe
Stainless Fittings and Valves
Stainless Aircraft Tubing
Aluminum Tube and Holobar
Aluminum Pipe and Fittings

Write Dept. I-5 for stock list

C. A. ROBERTS CO.

Steel & Aluminum Tube Specialists

2401 25th Ave., Franklin Park, Ill., GLadstone 5-6400

6 warehouses serving the middlewest

CHICAGO • DETROIT • INDIANAPOLIS
ST. LOUIS • TULSA • N. KANSAS CITY

NEW EQUIPMENT

all plating: Copper, nickel, chromium, zinc cadmium and precious metals. It applies copper stop-off plate in case hardening and builds up worn parts with hard-chromium

plating. You can equip the power unit with flexible leads and alligator clamps, and use it with several tanks. (Allen Aircraft Products, Inc.)

For more data circle No. 72 on postcard, p. 153

Vibrating Feeder

This new line of standard, heavy-duty vibrating feeders offers controlled conveying and feeding of aggregates, ores, coal and the like. They come with 5° or 10° slopes, and with either a solid-pan deck or a partial pan in combination with a grizzly feeder at the discharge end. The latter option particularly suits the removal of fines ahead of crush-

ers and scalping out over-size gravel. In fact, it's ideal for scalping ahead of crushers to make 100 pct crushed aggregate. (Allis - Chalmers Mfg. Co.)

For more data circle No. 73 on postcard, p. 153

Non-Index Machine

This clutch-type drilling machine offers simple operation. Here's how

WELD STAINLESS FASTER!

Use **AIRCOMATIC**® – Airco's gas shielded metal arc process. Terrific on austenitic plate ⅛" and over. For unbiased advice on any stainless application, call Airco – the only producer of complete equipment for Aircomatic, Heliwelding and stick electrode welding.

AIRCO **AIR REDUCTION SALES COMPANY**

A Division of Air Reduction Company, Incorporated, 150 East 42nd Street, New York 17, N. Y. • On the west coast – Air Reduction Pacific Company • Internationally – Airco Company International • In Canada – Air Reduction Canada Limited • All divisions or subsidiaries of Air Reduction Company, Inc.

IMPORTANT SAVINGS

Lower initial cost
Long life
Ultra high quality

Small Diameter
ROLLS

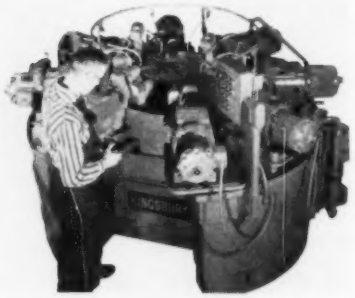
Special alloys with tough, fine-grained finish. Surfaces as fine as 3 micro inches RMS. Chrome plating available.

RECONDITIONING:
Rolls reconditioned like new at costs averaging 25% of new rolls. Rolls can be reconditioned several times!

Voss ENGINEERING CO.

7301 Penn Ave. Pgh 8, Pa.
Churchill 2-4422

it works. Eight units with two-spindle heads drill 16 holes at the same time. Gross rate is 350 parts per hour. A central fixture holds one work piece with its axis ver-

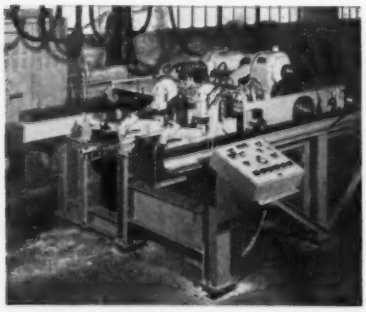


tical. Bushing carriers on the units clamp it down during the work cycle, then air cylinders partially eject it. Each unit drills two holes, one on the upper level and one on the lower. (Kingsbury Machine Tool Corp.)

For more data circle No. 74 on postcard, p. 153

Spacing-Table Carriage

Here's a new automation development — numerical control of a spacing-table carriage for punching structural shapes, using tape or dials. The unit feeds structurals up to 18,000 lb through a guillotine-beam punch that punches rivet or bolt holes into webs and flanges located anywhere along the workpiece. Dial control settings are to



decimal-equivalent dimensions. Tape and dial control can include operation of punch gags, positioning devices and machine clutch. The controls provide backstopping where required. The unit comes in three speed and weight combinations and in length multiples of 10 ft. (Beatty Machine & Mfg. Co.)

For more data circle No. 75 on postcard, p. 153

Pneumatic System

This complete line of negative-pressure pneumatic systems automate the handling of plastic cubes, prills, dice, pellets and chips. The systems are designed to help the small- and moderate-sized resin user take full advantage of bulk savings. In the past, each system had to be individually engineered. Now, by following a few simple steps, the plant manager can select the proper system in a matter of minutes. Basic components of the system are: A negative-pressure power unit, a stainless-steel rotary air lock and a stainless-steel cyclone collector (Young Machinery Co.)

For more data circle No. 76 on postcard, p. 153

Impact Wrench

Featuring a roll-action, time impact mechanism, a new heavy-duty impact wrench suits jobs requiring high-tensile bolt capacity of ¾-1¼ in. Its operation is not dependent on springs or motor velocity. The impacting blow engages and disengages with precise timing, using the ball-and-race principle of smooth, almost-frictionless rolling action. And, it maintains positive engagement regardless of speed or power input. Because of its simple construction and assembly, you can replace parts using ordinary tools. (Master Power Corp.)

For more data circle No. 77 on postcard, p. 153

Automatic Saws

These low-cost automatic saws combine hydraulics, electricity and pneumatics in a simplified form for tool-room or production-plant cutting. They slice all ferrous and nonferrous metals at speeds up to 140 5-in. strokes per minute. Capacity is 6 x 6-in. A rugged length gage incorporates a fine, micrometer-screw adjustment that quickly sets to hold lengths within 0.005 in. Minimum quantities of 5 or 10 pieces are cut automatically with operating savings because of the short setup time. (Racine Hydraulics & Machinery, Inc.)

For more data circle No. 78 on postcard, p. 153

Capacability means

Imagination

When it comes to oxygen furnace refractories, *imagination* is Basic. And, Basic can be your "fountainhead" of new refractory ideas. Take TARBLOK and TARMIX for example.

Six years ago the first U. S. oxygen steel producer looked to Basic for tar-bonded furnace lining refractories. With four years of intensive research behind us, we were ready. Today, Basic is a fully integrated supplier of these materials — shipping to virtually every oxygen steelmaker in the Western hemisphere.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

If you're looking for the simple, economical way to meet your steel needs, it will pay you to *look locally* . . . to look to your nearest Steel Service Center. There you'll find:

PROMPT DELIVERY—usually from LOCAL stocks.

WIDE SELECTION—many types available from your LOCAL Steel Service Center.

FABRICATION ASSISTANCE—the right answers to your design and fabrication problems . . . supplied by LOCAL qualified specialists.

LOWER INVENTORY INVESTMENT—an expense borne instead by your LOCAL Steel Service Center.

STORAGE SPACE—also furnished by your LOCAL supplier.

Get in touch with your dependable LOCAL source for steel . . . your Steel Service Center. See your Classified Telephone Directory for listings.

Alan Wood supplies major Steel Service Centers with high quality plate, sheet and strip . . . chances are *your* Steel Service Center is among those we serve.

ALAN WOOD STEEL COMPANY

Conshohocken, Pa. • STEEL PRODUCERS WITH THE CUSTOMER IN MIND

DISTRICT OFFICES AND REPRESENTATIVES: Philadelphia • New York • Los Angeles • Boston • Atlanta Cincinnati • Cleveland • Detroit • Houston • Pittsburgh • Richmond • St. Paul • San Francisco • Seattle Montreal, Toronto and Vancouver, Canada—A. C. Leslie & Co., Ltd.

What Powers the Steel Upturn

Steel is off the bottom. And the recovery will continue through the remainder of the year.

Three factors are at work. Added together they spell bigger backlogs for producers.

■ The steel industry is off the bottom. For the next few weeks, at least, there will continue to be further improvement in orders, production, and steel consumption.

The improved order rate is due to three major factors: 1. The change in the economic climate; 2. advance buying by automakers as a hedge against possible labor troubles; 3. normal seasonal factors.

When these factors are added together, they mean an increased order volume, extended delivery, bigger backlogs for steelmakers.

Steelmakers Comment—A leading Midwest steelmaker says his company's order backlog now is higher than at any time since June, 1960.

Another steelmaker says: "The increase is across the board as well as autos and auto suppliers. It's been a long wait—but we're back in business."

Big Questions—The upturn and the optimism it has generated raise some big questions by themselves: How long will the improvement last? What about the historical summer slowdown? And what about inventory buying?

The summer slump will hit steel. But it may do little more than level off the current uptrend temporarily. Overall, the third quarter will show continuing improvement. And many steelmakers expect the fourth quarter and the first quarter of 1962 to move up sharply.

Autos and Inventory—Inventory buying is mostly confined to the auto industry. And even there it is on a small scale. Many segments of the industry continue to press for fast delivery.

Actually, most of the increase in steel orders from the auto industry is a direct result of production schedule boosts. Last week the industry scheduled 131,000 units, highest for any week this year.

However, automakers plan an early and fast phase-out of current model production this summer in order to get production of 1962 models underway before labor contracts expire Aug. 31. But in the event of a strike, dealers will have to rely on ample stocks of 1961-model cars to carry them through the crisis.

Danger in Midwest—So far, mills have managed to handle the bulge in orders. While it has caused considerable strain, there has been no appreciable stretchout of deliveries. But it has taken some uneconomical measures, juggling of rolling mill schedules, shipping from a more distant producing point, etc.

The situation is probably more dangerous from a supply standpoint in the Midwest than elsewhere. There, mills are operating at 10 to 20 points higher than East Coast mills. But few customers in the Midwest have advanced their ordering timetables. They prefer to rely on out-of-area mills, if need be, for fast delivery.

But the divergence between individual company operating rates should be eliminated soon. And the majority of mills should settle down to an operating rate of just under 70 pct. This should cause some stretchout in deliveries.

District Steel Production Index 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	105	107	101	114
Buffalo	120	112	92	113
Pittsburgh	92	92	87	112
Youngstown	96	89	78	86
Cleveland	124	116	95	131
Detroit	128	117	107	144
Chicago	106	106	97	114
Cincinnati	115	113	98	124
St. Louis	114	111	105	101
Southern	106	101	104	110
Western	127	124	116	108
U. S. Index	106.7	104.3	95.8	112.8

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	1,988	1,943	30,975	47,979
Ingot Index				
(1957-59=100)	106.7	104.3	87.5	135.6
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$36.50	$36.50	$37.83	$33.17
No. 2 bundles	$24.17	$24.17	$25.83	$23.17

Scale Makers Report Gains

Though 1960 tapered off sharply for scale manufacturers, it was still a record year.

Now it looks like 1961 might even top last year in sales. Prices appear to be holding at a steady level.

■ New orders, shipments, and backlogs are increasing for scale manufacturers.

At the spring meeting of the Scale Manufacturers Assn. recently, scale producers reported an average increase in shipments during the first quarter of close to 10 pct over the first quarter of 1960.

New orders are generally running 15 pct ahead of last year. And backlogs at the end of March were just a little ahead of those six months ago. This reflects the improvement in orders so far this year.

Reversal—The current situation among scale producers is the opposite to that of 1960. Activity last year declined as the year progressed. It's been gaining every month so far.

Nevertheless, 1960 was a good year for the scale men. Shipments were almost 3 pct better than in 1959—a new record high. But during the last quarter, pessimism crept into the scale picture as new orders dropped.

Now, with an evident turn-about in both inquiries and new orders, there is considerable optimism in the industry. Predictions for the second quarter call for additional gains. In fact, this is expected to carry through the rest of the year.

New Era—Also, according to SMA, industrial scales are in a "new era." Standard line dial and beam type static weighing scales continue to sell well. And there is new emphasis on complete weighing systems.

A GOOD YEAR: Scale manufacturers report inquiries and new orders are increasing steadily. And there is a new emphasis on complete systems.

Many of these weighing systems are completely tailored to the buyer's requirements. Then too, there are many accessories that can be tied in with these systems. Among these added features: Control devices for the weights, remote indication and recording, triggered-controls at pre-determined weights, automatic registering tie-ins with a variety of data processing methods.

Salesmen-Engineers—The accurate and reliable weighing instrument has become the key component or brain of automatic processing systems, says SMA. This, it claims, was "unthought of" ten years ago.

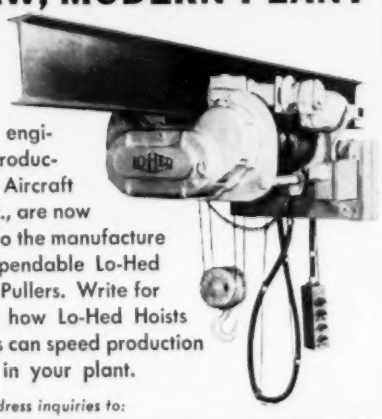
Many scale manufacturers queried by The IRON AGE report prices are generally stable. They say no increase is expected in the near future. But there are some producers hinting that higher prices may "have" to come soon to offset increased costs.

How
"AXIAL ADJUSTMENT"
Reduces Costs, Maintenance, and Wear

"Axial adjustment" is an important benefit on all heavy-duty DEMING sump, end suction and turbine pumps. It allows you to merely adjust the rotary assembly and compensate for wear. Better performance immediately. No new part needed. Call your DEMING distributor or write today for full information.

The DEMING Co.
571 BROADWAY • SALEM, OHIO

LO-HED® HOISTS NOW IN PRODUCTION IN A NEW, MODERN PLANT

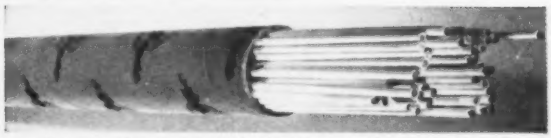


The advanced engineering and production facilities of Aircraft Armaments, Inc., are now being applied to the manufacture of rugged, dependable Lo-Hed Hoists and Car Pullers. Write for full details on how Lo-Hed Hoists and Car Pullers can speed production and cut costs in your plant.

Please address inquiries to:
AE INDUSTRIAL DIVISION
AIRCRAFT ARMAMENTS, INC.
Post Office Box 6853, Baltimore 4, Maryland
CLEVELAND DISTRICT: A.E. Company, 1157 Leader Bldg., Cleveland 14, Ohio
N. Y. DISTRICT: AE Industrial Division, 1 Exchange Place, Jersey City 2, N. J.

3 METHODS OF PRODUCTION BRAZING ...Which is best for you?

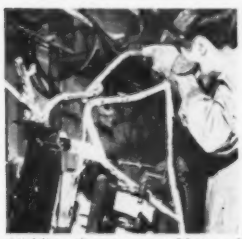
FLUX COATED ROD



A new brazing concept—engineered flux-coated bronze—thick and thin extruded coatings to fit maintenance or production needs.

Work goes fast and even with ALL-STATE's extra thin coated bronze type alloys. Flux is extruded evenly, at thickness of only .0065, to assure excellent control and easy clean-up. Narrow beads are obtained with consistent proportion of flux to rod. Coated rods are highly efficient, require minimum amounts of rod and flux.

BARE ROD AND FLUX



Welding time was cut 25% and clean-up time 75% by using All-State nickel-silver and separate flux when brazing 1" mild steel tubing in power saw frame production.

For the occasional job or where brazing operations change from time to time, ALL-STATE suggests that bare bronze with #41 or #1 flux is the most flexible method, providing maximum control of capillary flow. Recommended for deep joints.

Nickel-silver rod with #11 flux is a versatile combination for joining dissimilar metals. TS up to 80,000 psi.

The bare rod and flux method permits use of special fluxes for unusual applications.

AUTOMATIC FLUXING SYSTEM

World's largest industrial stapling machine manufacturer found solution to assembly problem with high-strength All-State #11 nickel silver and automatic Jet Flux production brazing systems.

The fastest method of surface brazing, and the most economical for production work, is automatic fluxing, available for bronze, copper and steel brazing alloys. ALL-STATE's system permits finger-tip control of liquid flux, is easy to use, requires minimum cleanup.

JET FLUX dispenser, approved by Factory◇Mutual, is simple to fill, operate, clean, and re-fill. Can be used to feed liquid flux in exact amounts through oxy-gas or air-gas systems. Save on fuel cost by using Liquid Jet Flux with oxy-propane or natural gas stepped up to 8 lb. pressure. Send for free information on how to adapt torch for these lower costing fuels.

ALL-STATE has quality rods and fluxes for all brazing methods. Send for folder on JET FLUX. Also free 56-page Instruction Manual and Catalog.

Distributors everywhere

All-State
ALL-STATE WELDING ALLOYS CO., INC.
White Plains, N.Y. Dial 914 WH 8-4646
QUALITY WITH SERVICE

Buyers Still Resist Inventory Buildup

Even though steel sales are gaining momentum, users are reluctant to do much advance ordering.

Mills are trying to meet all requests for fast shipment. But they are finding it more and more difficult.

■ While steel sales are on an upsurge, buyers are still not anxious to rebuild inventories.

They are depending on the mills to give them fast delivery. In many cases they are still seeking to get steel in two weeks or less. Mills can meet these demands a good part of the time.

More Call Backs—But there are more and more cases when the steelmakers can't make rush shipments. "Buyers come to us for fast delivery," says one sales official. "When we turn them down because we can't meet the time quoted, they shop around. But a growing number are coming back and accepting the shipping dates we can meet."

The attempt to meet short delivery schedules is putting a greater strain on the mills. So far shipping estimates haven't stretched out much. But the situation is growing more critical, especially in the Midwest.

Buyers often wait until late in the month to place orders. This leaves the mills uncertain about the actual order picture. There isn't any clear-cut measure of buyer demand until the tail end of the month.

Those Who Buy or Wait—Some steel users are quietly beginning to beef up inventories. Warehouses are among those keeping a close watch on steel stocks. Some have already increased buying and any stretchout in mill lead times could spur more warehouse buying.

Among other customers there's still reluctance to give up the policy of close inventory control. "One of our customers who uses about 1200 tons of sheet a month has about 700 tons in stock," says a steel salesman. "He has about 200 or 300 tons on our order books and has refused to place any new orders for May shipment."

Sheet and Strip—Auto demand is improving June orders. But aside from galvanized sheet (booked into July at many mills), deliveries on other flat-rolled products have stretched out little. **East Coast** mills can still make rapid shipment. At **Pittsburgh,** some producers can still take May tonnage. June bookings are running at little behind the pace of May orders this time last month. **Cleveland** mills report June auto steel orders are bolstering the market. Some buyers at **Chicago** maintain they can't get cold-rolled sheet in less than five weeks. But mills say both hot-rolled and cold-rolled sheet can be shipped in 2 to 4 weeks.

PURCHASING AGENT'S CHECKLIST

New ideas on how to cut handling costs presented. P. 109

Steelmakers give continuous casting a second look. P. 110

Super-strength structurals introduced by U. S. Steel; expected to fill gap in the use of super-strong steels. P. 112

Plates and Shapes — Structurals are moving at a fair pace on the **East Coast,** supported by orders for medium and small construction jobs. Plate is still weak. **Pittsburgh** mills point to a minor improvement in May orders for plates and shapes. At **Chicago,** structural mills are running strong, some as high as 21 turns a week. Plate is easier to get but is definitely gaining, even without linepipe support.

Bar—The market is inching upward. May is shaping up as a better month than April for **Pittsburgh** hot-rolled bar makers. June orders are ahead of the pace for May. A **Cleveland** sales executive says, "We're hearing from customers we haven't gotten an order from in six months." Most of the demand is from automakers, farm equipment builders, construction, and machinery makers. **Chicago** mills believe hot-rolled bar deliveries will stretch out soon. Cold-finished bar is sharing in the gains.

Product Developments — Great Lakes Carbon Co., St. Louis, Mo., and a scrap producer in that area are selling pig iron made from scrap to foundries for about $65 a ton. This is around $10 to $12 a ton under pig iron currently selling within the marketing areas. The product is produced in a hot blast cupola.

Jones & Laughlin Steel Corp. has developed a new high-strength, low-alloy grade of steel and has realigned its high strength steel grades. The new product is a nickel-copper-titanium high-strength, low-alloy steel with 50,000 psi minimum yield point and 70,000 minimum tensile strength.

Phoenix Steel Corp. is now rolling nickel-clad steel plate at its Claymont, Del., plant. This is the first commercial rolling of the product by Phoenix.

The first wide-flange beam mill west of Chicago will be built by Colorado Fuel & Iron Corp. at Pueblo, Colo. It's due for startup by the summer of 1962.

COMPARISON OF PRICES

(Effective May 15, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	May 15 1961	May 8 1961	Apr. 17 1961	May 17 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	May 15 1961	May 8 1961	Apr. 17 1961	May 17 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn. cents per lb.‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$34.50	$34.50	$35.50	$34.50
No. 1 steel, Phila. area	39.50	39.50	40.50	34.50
No. 1 steel, Chicago	35.50	35.50	37.50	30.50
No. 1 bundles, Detroit	33.50	33.50	34.50	29.50
Low phos. Youngstown	39.50*	37.50	38.50	36.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	50.50
No. 1 mach'y cast, Phila.	49.50	49.50	50.50	51.50
No. 1 mach'y cast, Chicago	47.50	47.50	49.50	51.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$36.50	$36.50	$37.83	$33.17
No. 2 bundles	24.17	24.17	25.83	23.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$30.00	$30.00	$29.00	$33.00
Copper, Lake, Conn.	30.00	30.00	29.00	33.00
Tin, Straits, N. Y.	110.125†	109.875**	100.50	99.50
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	28.10
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

INDUCTION CONSUMABLE LEADED

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

INDEX TO PRICE PAGES

Prices At a Glance 183
Comparison of Prices 187
Bars 194
Billets, Blooms and Slabs 192
Boiler Tubes 198
Clad Steel 198
Coke 197
Electrical Sheets 198
Electrodes 198
Electroplating Supplies 198
Fasteners 196
*Ferroalloys
Iron Ore 196
Merchant Wire Products 196
Metal Powders 198
Nonferrous
Mill Products 191
Primary Prices 187, 190, 191
Remelted Metals 191
Scrap 191
Piling 192
Pig Iron 196
Pipe and Tubing 197
Plates 194
Rails 198
Refractories 198
Service Center Prices 195
Shapes 192
Sheets 193
Spring Steel 198
Stainless 196
Steel Scrap 189
Strip 192
Structurals 192
Tinplate 193
Tool Steel 196
Track Supplies 198
Water Pipe Index 197
Wire 194
Wire Rod 193

* Appears in the May 11-May 25 issues.

THE 52100 HOUSE

PETERSON STEELS, INC.

Union, N. J. · Wethersfield, Conn.
Detroit, Mich. · Melrose Park, Ill.

Market Shows Signs of Firming

There are definite signs of firmness in the scrap market this week. Some prices are up; others are stable.

Many scrapmen are hoping increased steel operations will aid domestic business.

■ The scrap market may be poised for gains again. At least there appears to be a definite firming trend in most key areas this week.

Chief reason: Increased steel operations.

Scrapmen note that there isn't too much tangible evidence for optimism at this time. But dealers are bullish and refusing to sell at lower levels. They anticipate increased demand as steel operations rise.

The chance of better domestic interest comes at a time when many scrapmen say exports might not hit the record that had been earlier predicted. Export tonnage during the first quarter, however, was up from last year's record levels. If anything, 1961 will probably match 1960's overseas shipment (see p. 13).

The market was up in Cleveland this week. And firmness is reported in Detroit, New York, Pittsburgh and Chicago. Philadelphia scrapmen says prices could drop another notch soon, but there is another element that feels an upward move is anticipated.

The IRON AGE composite prices for No. 1 heavy melting and No. 2 bundles remains unchanged this week.

Pittsburgh — The market has firmed up here. There is no new activity, but dealers are no longer willing to sell at reduced prices. The yards have watched the market level off without mill support. They are hoping improved operations will bring more consumer activity soon. Also, there are encouraging signs in other districts. A mill in one nearby area has reportedly raised its price for prime scrap. The increase hasn't been enough to pull scrap from Pittsburgh, but it has contributed to the more optimistic feeling. On a late railroad list, prices were down from last month but the losses were smaller than on earlier offerings.

Chicago—Volume in the market dropped sharply as mills held the price line. But dealers and brokers found it increasingly difficult to fill existing orders. A $38 purchase of No. 1 heavy melting for the export market was a stiffening factor in the market. It has forced broker buying prices upward. Only minor price changes are reported at the consumer delivered level. Buyers still battle the stiffening price picture.

Philadelphia — The market is poised for another move. But most scrapmen aren't certain whether it's going to go up or down. There is a chance that further drops can come. One buyer is putting out feelers for lower prices, but scrapmen aren't anxious to sell at reduced levels.

New York — This market has steadied somewhat in the last week. Export demand isn't picking up as some had hoped. But there are no signs of further drops. Some dealers now figure the market has leveled off at current prices.

Detroit — Industrial Scrap offerings will be hefty on the June lists. Prices seem relatively stable. There has been a slight tone of steadying in the past few days. However, signs of an uptrend in the next 30 days are not appearing.

Cleveland—Market is up $1 on No. 1 dealer grades on the basis of Valley purchases. The market tone is definitely bullish and an additional increase by next month is possible.

Cincinnati—Market is continuing strong in tone. Any new orders would cost more than earlier this month. An upward move for June is indicated.

St. Louis—The market remains quiet with prices unchanged. Not much scrap is being offered to mills; and mills aren't really looking for it. However, the firm undertone still prevails.

Birmingham — The market is very firm. There is some movement of foundry steel but no large tonnages. Cast activity is lacking. But there has been some purchases of No. 2 heavy melting scrap.

Buffalo—New purchases of cast scrap were made at the week's end at quoted prices. Otherwise the market remains quiet and prices unchanged.

Boston—The market is quiet and export demand has slackened considerably. Several grades sold at lower levels this week.

West Coast—Top steelmaking grades dropped $1 to $2 in San Francisco and Los Angeles. Seattle prices remain firm. Exporting is still very active.

Houston—The market remains unchanged although the district mill said it will not make new purchases this month. A major exporter says activity will taper off around the middle of June.

SCRAP PRICES *(Effective May 15, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$34.00 to $35.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	34.00 to 35.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs plate	40.00 to 41.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	37.00 to 38.00
Scrap rails, random lgth.	45.00 to 46.00
Rails, 2 ft and under	49.00 to 50.00
RR specialties	41.00 to 42.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	34.00 to 35.00
Stainless	
18-8 bundles and solids	180.00 to 185.00
18-8 turnings	100.00 to 110.00
430 bundles and solids	80.00 to 85.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	36.00 to 37.00
No. 1 factory bundles	40.00 to 41.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Low phos. forge crops	43.00 to 44.00
Low phos. punch'gs plate, ½ in. and heavier	42.00 to 43.00
Low phos. 2 ft and under	39.00 to 40.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rails, random lgth.	46.00 to 47.00
Rerolling rails	57.00 to 58.00
Rails 2 ft and under	49.00 to 50.00
Angles and splice bars	44.00 to 45.00
RR steel car axles	57.00 to 58.00
RR couplers and knuckles	44.00 to 45.00
No. 1 machinery cast.	47.00 to 48.00
Cupola cast.	42.00 to 43.00
Cast iron wheels	34.00 to 35.00
Malleable	46.00 to 47.00
Stove plate	37.00 to 38.00
Steel car wheels	42.00 to 43.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	100.00 to 105.00
430 bundles and solids	90.00 to 95.00
430 turnings	50.00 to 55.00

Philadelphia Area

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings	27.00 to 28.00
Low phos. 5 ft and under	42.00 to 43.00
Low phos. 2 ft punch'gs	44.00 to 45.00
Elec. furnace bundles	42.00 to 43.00
Heavy turnings	27.00 to 28.00
RR specialties	42.00 to 43.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Cast iron car wheels	40.50 to 41.50
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.50 to 28.50
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	37.00 to 38.00
Rails, random length	41.00 to 42.00
Rails, 18 in. and under	46.00 to 47.00
No. 1 cupola cast.	34.00 to 35.00
Heavy breakable cast.	28.00 to 29.00
Drop broken cast.	45.00 to 46.00

Youngstown

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Low phos. plate	39.00 to 40.00

Cleveland

No. 1 hvy. melting	$33.50 to $34.50
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	33.50 to 34.50
No. 1 factory bundles	37.00 to 38.00
No. 2 bundles	21.50 to 22.50
No. 1 busheling	33.50 to 34.50
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Cut structural & plates, 2 ft & under	37.00 to 38.00
Low phos. punch'gs plate	34.50 to 35.50
Drop forge flashings	33.50 to 34.50
Foundry steel, 2 ft & under	32.00 to 33.00
No. 1 RR hvy. melting	37.50 to 38.50
Rails 2 ft and under	48.00 to 49.00
Rails 18 in. and under	49.00 to 50.00
Steel axle turnings	26.00 to 27.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	47.00 to 48.00
Stove plate	38.00 to 39.00
Malleable	50.00 to 51.00
Stainless	
18-8 bundles	170.00 to 175.00
18-8 turnings	100.00 to 105.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	31.00 to 32.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. plate	37.00 to 38.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth.	38.00 to 39.00
Rails 2 ft and under	48.00 to 49.00
No. 1 machinery cast.	44.00 to 45.00
No. 1 cupola cast.	38.00 to 39.00

St. Louis

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	28.00 to 29.00
Foundry steel, 2 ft	31.00 to 32.00
No. 1 dealer bundles	34.00 to 35.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	12.50 to 13.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	21.00 to 22.00
No. 1 RR hvy. melting	36.00 to 37.00
Rails, random lengths	39.00 to 40.00
Rails, 18 in. and under	43.00 to 44.00
RR specialties	39.00 to 40.00
Cupola cast.	38.00 to 39.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	54.00 to 55.00
Unstripped motor blocks	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$32.00 to $33.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles	36.00 to 37.00
Elec. furnace, 3 ft & under	34.00 to 35.00
Bar crops and plate	43.00 to 44.00
Structural and plate, 2 ft	42.00 to 43.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rail, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	42.00 to 43.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	35.00 to 36.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	24.00 to 25.00
No. 2 dealer bundles	18.00 to 19.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	20.00 to 21.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	29.00 to 30.00
Drop forge flashings	28.00 to 29.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	39.00 to 40.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	70.00 to 75.00
430 bundles and solids	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.50 to $30.50
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	4.00 to 4.50
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings	15.50 to 16.50
No. 1 machinery cast.	39.00 to 40.00
Mixed cupola cast.	32.00 to 32.50
Heavy breakable cast.	28.00 to 28.50

San Francisco

No. 1 hvy. melting	$41.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	28.00
No. 2 bundles	25.00
Machine shop turn.	15.00
Cast iron borings	15.00
No. 1 cupola cast.	$45.00 to 46.00

Los Angeles

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	37.00
No. 1 dealer bundles	29.00
No. 2 bundles	$25.00 to $26.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	15.00
Elec. furnace 1 ft and under (foundry)	48.00 to 50.00
No. 1 cupola cast.	46.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	25.00
No. 1 cupola cast.	36.00
Mixed yard cast.	31.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$31.00
No. 2 hvy. melting cut 3 ft and under	28.00
No. 1 dealer bundles	31.00
No. 2 bundles	21.00
Mixed steel scrap	23.00
Bush., new fact., prep'd	31.00
Bush., new fact., unprep'd.	25.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	31.00
No. 2 bundles	24.00
Machine shop turn.	8.00
Shoveling turnings	11.00
Cut structural plate 2 ft & under	$47.00 to 48.00
Unstripped motor blocks	29.00 to 30.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	29.00 to 30.00

How High Will The Copper Price Go?

BULLETIN: Anaconda Copper Co., effective May 16, increased its copper price to 31¢ a lb, up 1¢ a lb.

Other major producers were expected to follow. Custom smelters, who had hoped for a bigger boost, were disappointed.

■ The U.S. secondary copper industry is so sure the primary price will top 30¢ per lb soon that many are looking farther into the future.

The consensus: Primary copper soon will be priced at 32¢. And it will be higher than that before the end of the year.

Figures Vary—Several spokesmen told the IRON AGE they expect the primary copper price to hit 36¢ per lb before the year is over. But many copper scrap dealers and smelter spokesmen figure it won't go that high. And they have good reasons:

There will be stiff resistance to so high a copper price from some major producers, said one dealer. He believes these companies feel at that level copper will invite increased competition from other materials, such as aluminum.

High Income—The argument on the other side: Every 1¢-per-lb the copper price goes up means millions of dollars in income to the major producers. Industry men think some producers won't pass this up.

Some copper scrap dealers and spokesmen for smelters expect copper to be at 34¢ per lb before the year is ended.

One dealer figures the copper price will hit 33¢ before the end of the third quarter. And he won't even hazard a guess as to the last quarter.

Price Paradox—At the Copper and Brass Research Assn. meeting this week, Dr. Joseph Zimmerman, vice president of Miles Metals Corp., called the current copper market a paradox—"a rising price trend at a time when production is running in excess of consumption, and when world producers are carrying substantial stocks of unsold copper."

What is causing this situation? "Both domestic and foreign consumers have been buying more copper than their immediate needs call for, chiefly as a protection against future contingencies," says Dr. Zimmerman.

His prediction: "A dual copper price is by no means improbable—a custom smelter quotation that would be higher than the producers' level."

No Runaway—Dr. Zimmerman also believes, "While there is every indication of a further upward trend in the price of copper, no runaway market such as prevailed in 1955 and in 1956 is likely."

New statistics from the Copper Institute have been released. They are by far the most optimistic yet this year.

In the U.S., copper deliveries to fabricators in April rose to 125,905 tons from 112,448 tons in March. This took a healthy slice out of unsold refined stocks. At the end of April there were 114,247 tons. At the start of the month there had been 139,274 tons.

Outside the U.S., deliveries were off slightly in April—198,835 tons, compared with 207,882 tons in March. But refinery output was also down. So refined stocks at the end of the month were smaller—333,151 tons, from 337,505 tons.

Aluminum

It looks like the Kaiser-Kawneer merger is doomed.

Kaiser Aluminum & Chemical Co. had agreed to exchange some of its stock for Kawneer Co. stock. Kawneer makes metal architectural products, and Kaiser is trying to get into that field.

The Justice Dept. objected.

New Venue—Here's the picture, painted by an unofficial source. Kaiser will probably try for a change of venue to Niles, Mich., home of Kawneer, to plead against the injunction asked by Justice Dept. against the merger.

Kaiser will probably not get it.

It was estimated that it would take $250,000 and three years to settle the issue in court.

Tin Prices for the Week

May 9 — 110.125; May 10 — 110.125; May 11—109.50; May 12—109.75; May 15—110.125*.

*Estimate.

Primary Prices

(cents per lb.)	current price	last price	date o change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E	30.00	29.00	5/3/61
Copper (CS)	30.00	29.00	5/1/61
Copper (L)	30.00	29.00	5/2/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 191.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/4
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.13	.....	52.36	56.32
Brass, Yellow	48.77	49.06	48.71	52.93
Brass, Low	51.45	51.74	51.39	55.51
Brass, Rod	52.39	52.68	52.33	56.45
Brass, Naval	53.51	59.82	47.32	57.67
Muntz Metal	51.54	.....	46.85	.....
Comm. Bz.	53.88	.....	53.82	57.69
Mang. Bz.	57.27	.....	50.85	.....
Phos. Bz. 5%	75.87	75.62	76.37	77.80

Free Cutting Brass Rod 34.33

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $70.00
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) ...$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... $29.95 to $36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9% dollars per troy oz.. $ 2.25
Iridium, dollars per troy oz.....$75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb..... 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $203 to $205
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz...$24 to $26
Platinum, dollars per troy oz...$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.) 91.375
Thorium, per kg $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 31.25
- No. 120 ..... 30.50
- No. 123 ..... 29.75

80-10-10 ingot
- No. 305 ..... 35.25
- No. 315 ..... 33.00

88-10-2 ingot
- No. 210 ..... 43.00
- No. 215 ..... 39.75
- No. 245 ..... 35.00

Yellow ingot
- No. 405 ..... 26.75

Manganese bronze
- No. 420 ..... 29.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 24.25-24.50
- 0.60 copper max. 24.00-24.25

Piston alloys (No. 132 type)...26.00-27.00
No. 12 alum. (No. 2 grade)...22.75-23.25
108 alloy 23.25-23.75
195 alloy 25.75-26.75
13 alloy (0.60 copper max.)...24.00-24.25
AXS-679 (1 pct zinc) 23.00-24.00

Steel deoxidizing aluminum notch bar granulated or shot
Grade 1—95-97½% 23.75-24.75
Grade 2—92-95% 22.50-23.50
Grade 3—90-92% 21.50-22.50
Grade 4—85-90% 21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19⅞	18
Red brass	23	22¼
Comm. bronze	23⅞	23⅛
Mang. bronze	18¾	18
Free cutting rod ends.	19	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28¼
- No. 2 copper wire 26¼
- Light copper 24
- *Refining brass 25
- Copper bearing material 24

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 28¼
- No. 2 copper wire 26¼
- Light copper 24
- No. 1 composition 23¾
- No. 1 comp turnings 23¼
- Hvy yellow brass solids 18
- Brass pipe 17
- Radiators 19

Aluminum

- Mixed old cast. ..... 12½—13
- Mixed new clips ..... 14½—15
- Mixed turnings, dry ..... 13½—14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 24½—25
- No. 2 copper wire ..... 23 —23½
- Light copper ..... 20½—21
- Auto radiators (unsweated) .. 16½—17
- No. 1 composition ..... 20½—21
- No. 1 composition turnings .. 19½—20
- Cocks and faucets ..... 17 —17½
- Clean heavy yellow brass ... 14 —14½
- Brass pipe ..... 17 —17½
- New soft brass clippings .... 16¾—17¾
- No. 1 brass rod turnings .... 16½—17

Aluminum

- Alum. pistons and struts .... 7 — 7½
- Aluminum crankcase ..... 9½—10
- 1100 (2s) aluminum clippings 12¼—12¾
- Old sheet and utensils ..... 9½—10
- Borings and turnings ..... 4½— 5
- Industrial castings ..... 10 —10½
- 2020 (24s) clippings ..... 11 —11½

Zinc

- New zinc clippings ..... 5½— 5¾
- Old zinc ..... 3½— 4
- Zinc routings ..... 1¾— 2
- Old die cast scrap ..... 1¾— 2

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 23-23.50
- Clean Monel turnings 16.50-17
- Old sheet Monel 22-23
- Nickel silver clippings, mixed. 18
- Nickel silver turnings, mixed. 15

Lead

- Soft scrap lead ..... 7¼— 7¾
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 78 —79
- No. 1 pewter ..... 59 —60
- Auto babbitt ..... 44 —45
- Mixed common babbitt ..... 9½—10
- Solder joints ..... 14½—15
- Small foundry type ..... 8½— 9
- Monotype ..... 8¾— 9¼
- Lino. and stereotype ..... 8 — 8¼
- Electrotype ..... 7½— 7¾
- Hand picked type shells ..... 5¼— 5¾
- Lino. and stereo. dross ..... 1¾— 2¼
- Electro dross ..... 2 — 2½

(Effective May 15, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$93.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1, T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective May 15, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb. 0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb. 0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*				$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*				Holloware Enameling 29 ga. – *7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.		
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3* 7.50 *C19**									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	$6.25 *U1, I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1†† R3*	7.525 *R3, S1*	9.275 *R3*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.125 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*		6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Electrogalvanized sheets. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective May 15, 1961)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Conshohocken, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Coatesville, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*									
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*	5.00 *A8*									8.00 *A8* 8.35 *M4*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective May 15, 1961) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.
B9 Barry Universal Corp., Detroit, Mich.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19 Canfield Steel Co., Canfield, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit
H2 Hercules Drawn Steel Corp., Toledo, O.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M10 Mill Strip Products Co., of Pa., New Castle, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery; Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore	$.10	7.87	9.71	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	16.76	16.65	.....	.....
Boston	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.79	16.79	21.89	21.14
Buffalo	.15	8.70	9.45	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.85	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.90	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	.....	.....	.....	20.84
Detroit**	.15	9.63	10.61	11.20	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		10.17	10.98	11.35[3]	11.73	9.41	9.81	9.58	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	11.20	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.13	10.50	10.95	11.44	9.47	9.82	8.97	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.51	10.49	10.99	11.68	9.35	9.94	9.51	11.84	17.24	16.24	21.24	20.49
New York	.10	9.77	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia	.10	9.90	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		9.45	11.30	12.35	12.40	10.55	11.00	9.45	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.75	11.23	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	9.72	10.39	11.54	11.89	9.56	10.07	9.72	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 17"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅛" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13g zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective May 15, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bardaboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container) — Pct

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk	46
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	46

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs 50
5/16, ⅜ & ½ in. diam	15,000 pcs 50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

f.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective May 15, 1961)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25–21.50	—	19.75–21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25–26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.60	35.00–31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25–31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.80	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25–29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; Vandergrift, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Detroit, *M2*; Louisville, O., *R5*.

Strip: Midland, Pa., *C11*; Waukegan, Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville Pa., *U2*; Detroit, *M2*; Detroit, *S1*; Canton, Massillon, O., *R3*; Harrison, N. J., *D3*; Youngstown, *R5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7*; S. Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R5*; S. Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5, R3*; Ft. Wayne, *I4*; Detroit, *R5*; Gary, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *I4*; Newark, N. J. *D2*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*; Detroit, *R5*; Reading, Pa., *C2*; Bridgeport, Conn., *N8* (down to and including ¼").

Structurals. Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*; S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7*; Baltimore, *E1*; Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Vandergrift, Pa., *U1*; Gary, *U1*.

Forging billets: Ambridge Pa., *B7*; Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*; Munhall, Pa., S. Chicago, *U1*; Owensboro, Ky., *G5*; Bridgeport, Conn., *N8*; Reading, Pa., *C2*.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3***	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Chicago *W7*	173	.....	.....	.....	.....	9.00	9.55†
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2**	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***.	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	...	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

STANDARD T. & C.	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

PUZZLED . .

about personnel problems

Dissatisfied with present recruiting methods? The IRON AGE Employment Exchange is the meeting place for employers, and men qualified in all phases of metalworking. For advertising rates, write to Chestnut and 56th Sts., Philadelphia 39.

PRECISION

VARIABLE OR STEP-PULLEY MODELS

Model 1200 20" Drill Press

15" or 20" models in single units or multiple spindle arrangements for every job requirement. Famous Powermatic precision, safety and dependability assures years of rugged service.

BAND SAWS • DRILL PRESSES • GRINDERS

Dealers in Principal Cities

POWERMATIC®
MACHINE COMPANY
McMinnville, Tennessee
Dept. 6

New
COMPLETE POWERMATIC CATALOG!
SEND FOR YOUR FREE COPY TODAY!

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25			
Cleveland *R5*						15.35
So. Chicago *R5*				10.10		
Ensley *T2*	5.75	6.725				
Fairfield *T2*		6.725		10.10	6.875	
Gary *U1*	5.75				6.875	
Huntington, *C16*		6.725				
Ind. Harbor *I4*				10.10		
Johnstown *B5*		6.725				
Joliet *U1*			7.25			
Kansas City *S2*				10.10		15.35
Lackawanna *B5*	5.75	6.725	7.25		6.875	
Lebanon *B4*			7.25			15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*						15.35
Pittsburgh *J5*				10.10		
Seattle *B2*					7.025	15.85
Steelton *B5*	5.75		7.25		6.875	
Struthers *Y1*				10.10		
Torrance *C7*					6.75	
Williamsport *S5*		6.725				
Youngstown *R5*				10.10		

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	9.10				
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	16.85
Bristol, Conn. *W12*		10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70		
Detroit *D1*	9.05	10.50	12.70	15.70	
Detroit *D2*	9.05	10.50	12.70		
Dover, O. *C4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*			12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.40	15.60	
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*		10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper

Rolled elliptical, 18 in. or longer, 5000 lb lots 43.50
Electrodeposited, 5000 lb lots 36.50
OFHC anodes ..... 41.50 to 44.50 (depending on shape)
Brass, 80-20, ball anodes, 2000 lb or more 50.50
Zinc, ball anodes, 2000 lb lots ..... 18.75 (for elliptical add 1¢ per lb)
Nickel, 99 pct plus, rolled carbon, 5000 lb ..... .945 (Rolled depolarized add 3¢ per lb)
Cadmium, 5000 lb 1.60
Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.. 65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit 17.45
Nickel sulfate, 5000 lbs 29.00
Nickel chloride, freight allowed, 100 lb 45.00
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums.... 25.80
Zinc cyanide, 100 lb, N. Y. 60.75
Potassium cyanide, 100 lb drum N. Y., del'd east of Rockies..... 46.50
Chromic acid, flake type, 10,000 lb or more, N. Y. 30.44

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders

Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R. 11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots 25.75
Carbonyl Iron (200 lb lots) 88.00
Welding Grades 8.10
Cutting and Scarfing Grades 9.85
Hydrogen reduced, domestic 11.25

Copper Powders

Molding Grades
Electrolytic, domestic, f.o.b. shipping point. 15.00†
Atomized ..... 43.3 to 61.3
Reduced ..... 15.00†
Chemically Precipitated 43.5
Brass, 5000-lb lots ..... 32.6 to 49.6
Bronze, 5000-lb lots ..... 50.3 to 54.1
Chromium, electrolytic 5.00
Lead ..... 7.50†
Manganese, electrolytic ... $1.00
Molybdenum ..... $3.60 to $4.35
Nickel $1.15
Carbonyl Nickel, 20,000 lb lots $1.01
Nickel-Silver, 5000 lb lots.. 58.5 to 66.6
Silicon 70.00
Solder ..... 7.00†
Stainless Steel, 316 ..... $1.07
Stainless steel 304 ..... 89.00
Tin ..... 14.00†
Titanium, 99.25 + pct, per lb, f.o.b. $11.25
Tungsten, carbide grades... $3.25
Zinc ..... 19.5 to 32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30		
		Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa *(J3)*; Beech Bottom *(W5)*; Brackenridge *(A3)*; Granite City *(G2)*· Indiana Harbor *(I3)*; Mansfield *(E2)*; Newport, Ky. *(A9)*; Niles, O. *(S1)*; Vandergrift *(U1)*; Warren, O. *(R3)*; Zanesville, Butler *(A7)*.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*) 10 pct	15 pct	20 pct	Sheet (*I2*) 20 pct
Stainless Type	302				37.50
	304	28.80	31.55	34.30	40.00
	316	42.20	46.25	50.25	58.75
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.00; 1 side, $36.10.

(Effective May 15, 1961)

REFRACTORIES

Fire Clay Brick

Carloads per 1000

Super duty, Mo., Pa., Md., Ky.... $185.00
High duty (except Salina, Pa., add $5.00) 133.00
Medium duty 125.00
Low duty (except Salina, Pa., add $2.00) 103.00
Ground fire clay, net ton, bulk... 22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala. $158.00
Childs, Hays 163.00
Chicago District 168.00
Western Utah 183.00
California 185.00
Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O. 163.00-168.00
Silica cement, net ton, bulk, Chicago 26.75
Silica cement, net ton, bulk, Ensley, Ala. 27.75
Silica cement, net ton, bulk, Mt. Union, Pa. 25.75
Silica cement, net ton, bulk, Utah and Calif. 39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md. $620.00
Gary, Ind. 658.50
Standard, Pascagoula, Miss. 647.50
Standard chemically bonded, Curtiner, Calif. 119.00
Burned, Baltimore 585.00

Magnesite Brick

Standard, Baltimore $715.00
Chemically bonded, Baltimore 655.00
Chemically bonded, Pascagoula, Miss. 682.50

Grain Magnesite

St. ⅝ to ½-in. grains

Per net ton

Domestic, f.o.b. Baltimore in bulk. $73.00
Domestic, f.o.b., Pascagoula, Miss... 80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.
in bulk 46.00
in sacks 52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:
Pa., W. Va., Ohio $16.75
Missouri Valley 15.60
Midwest 17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE Diam. (In.)	Length (In.)	Price	CARBON* Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100,110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	B.W. Ga.	Seamless H.R.	C.D.	Elec. Weld H.R.
Babcock & Wilcox..	2	13	40.28	47.21	35.74
Jones & Laughlin *	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube.....	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel...	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

"I'm a twenty-year man, myself..."

"I've been using the Payroll Savings Plan since we first put it in."

"Twenty years ago I had the best intentions and the worst performance on thrift you ever saw. I was always starting regular savings, *next payday*. Then I signed up for our company plan for buying U. S. Savings Bonds on systematic deductions and things really began to happen. For a man like me the savings allocation has to be taken out first, and our Plan does just that. Like so many of our people around here, I've stayed right with the Plan since the day we set it up."

If your company now has the Payroll Savings Plan in operation, you will find you can increase the percentage of employee participation by reminding every member of your staff that this well-proved method of automatic saving is available. If you do not now have the Plan, contact your State Savings Bonds Director and get his experienced cooperation in getting a Payroll Savings invitation to each employee.

NOW! U. S. SAVINGS BONDS EARN 3¾%

20th ANNIVERSARY 1941 1961

The IRON AGE

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

COMPRESSORS

No better values at any price

100 CFM 150 psi 6 x 7 Ing.
138 CFM 100 psi 7 x 7 Ing.—CPT—Worth.
183 CFM 150 psi 7 x 7 Jey WG9.
234 CFM 100 psi 9 x 9 Ing.—Worth Chic. Penn.
290 CFM 75 psi 10 x 9 Ing. ES-1
334 CFM (Actual) 120 psi Fuller C70-70H
75 HP 3-60-220/440
465 CFM 100 psi 12 x 11 IR—Worth—CP.
502 CFM 125 psi 12 x 13 Ing. Rand. Worth.
593 CFM 110 psi 13½-8½ x 8 Worth DC2
100 HP 3-60-440/550 Syn.
686 CFM 100 psi 14 x 13 IR.
805 CFM 125 psi 17-10 x 12 Ch. Pn. OCE.
150 HP-3-60-2300 Syn.
1020 CFM 60 psi 13-13 x 12 IR-XRE
125 HP Syn 3-60-220-1PF
877 CFM 125 psi 17/10½ x 14—IR—XRB.
2520 CFM 125 psi 17-10¾ x 8 Clark CMA 4L
350 hp. Syn. 3-60-2300.
2600 CFM 45 psi 20-20 x 14 Ing. Rand XRE
250 hp. Syn. 3-60-550-.8PF
Portable Gas-diesel 60'-600'.

AMERICAN AIR COMPRESSOR CORP.
DELL AND IRON STREETS
NORTH BERGEN, N. J.
Telephone UNion 5-4848

FOR SALE OR RENT

1500 HP Alco Diesel Electric Switcher Locomotives. New 1949. Excellent Condition. 7 Available.
44 Ton Gen. Elec. Diesel Elec. Loco. Cummins 190 HP Engine. 4 Traction Motors. Rebuilt.
25 Ton Gen. Elec. Diesel Elec. Loco. New 1942. Cummins Engine.
40 Ton Ind. Brownhoist Diesel Loco. Crane. New 1946. Caterpillar Eng.
25 Ton Ind. Brownhoist ±5 Diesel Loco. Crane. New 1941. Cat. Eng. Recond.
60 Ton Link-Belt K-595 Lifting Crane. 120' Boom. Cat. D-17000 Diesel.

WHISLER EQUIPMENT CO.
1910 Railway Exchange Bldg., St. Louis 1, Mo.
CHestnut 1-4474

PRESSES

1—1500 Ton Hobbing Press, French Oil Mill, 40" x 40" Bed Area; 30" Ram for 4300 PSI, 27" Stroke, 30" Daylight with hydraulics; 5" Pullbacks—like new.

1—1200 Ton Lake Erie Powder Press, 32" x 45" Bed, Down Moving; 38" Ram for 2250 PSI; 7" Stroke; 24" Daylight. Fast traverse with complete Oilgear Hydraulics—Excellent.

1—1100 Ton R. D. Wood Horizontal Cordite Press; 20" x 24", Charging Box with Hinged Quick Opening Die Holder; 34" Ram for 2500 PSI; 29" Stroke with 40 HP Oilgear Hydraulics. New—Bargain Priced.

Many miscellaneous smaller presses 200 Ton and Upward—Send us your Inquiries.

ERIE ENGINE & MFG. COMPANY
Erie, Pa. GL 4-7111

CRANES
BOUGHT & SOLD
ENGINEERED TO YOUR REQUIREMENTS
Ornitz Equipment Corp.
Industrial Engineering Service
595 Bergen St. Brooklyn 38, N. Y.
NEvins 8-3566

Farwest Activity: Generally Strong

Used machinery dealers in the Farwest say business is generally good. Southern California reports some weakness.

But other areas are finding customers and sales plentiful.

■ Used machinery buyers in southern California just aren't willing to spend money. That's the consensus of a spot-check of the leading used tool dealers in the Farwest's biggest market.

Interest is there. Calls and inquiries are plentiful. But the customers are cautious about spending the money. The most frequent dealer complaint is that work order backlogs are too thin.

Dealer inventories are high and often customers get "steal" prices just to keep stock moving.

Top Items—Grinders and boring mills are now selling well. But shears and press brakes still head the list of best sellers.

In northern California business has picked up for the used machinery dealer. It's nothing startling, but the sales action is brisk. Several San Francisco area dealers bought heavily at auctions and government surplus sales recently. This additional equipment stimulates interest in the area.

One dealer in that area, especially pessimistic in recent months, is beginning to feel optimistic. "We're getting more inquiries," he says. "We've had more action in the past few weeks than we've had in a long time."

Closer to Buying — While he adds that it's "nothing we're going to get rich on," he notes prospects are more seriously interested. They come closer to the brink of buying than they have in months.

Another dealer, who normally classifies himself as a guarded optimist, puts a lot of faith in increased depreciation allowances as a big business stimulant—if it ever comes.

Prices remain fairly stable. This is especially true of equipment built since 1951. Very few dealers are doing any reconditioning. And financing doesn't seem to be a problem when there's a need for a particular piece of machinery.

Auction Interest — Big metalworking companies are showing more interest in auctions and government sales now. They'll spend money for hard-to-get machinery rather than have the dealer scout for it.

But a bright sign for the dealer is that foreign equipment seems to have lost its lustre. The price differential between new foreign tools and used American machinery is no longer great.

"Yes, we have an opening here. You just came through it."

Faster From Foster

Nation's Largest Warehouse Stocks

RAIL AND TRACK MATERIAL

PIPE, VALVES, FITTINGS

L. B. FOSTER CO.

Pittsburgh 30 · New York 7 · Chicago 4 · Houston 2
Los Angeles 5 · Atlanta 8 · Cleveland 35

SALE OR RENT

45 & 65 Ton Diesel Electric Locomotives
25 & 40 Ton Diesel Locomotive Cranes
2—1000 K.W. Diesel Generator Sets, 2300 V—AC—direct connected to 16-278A GM Diesel Engines

B. M. WEISS COMPANY
Girard Trust Bldg. Philadelphia 2, Pa.

FOR SALE

MODEL 25 CD CHAMBERSBURG CECO AIR DROP HAMMERS 2500 LB. CAP. cecolloy basis in like new condition built 1952. These machines have seen only slight use on light work, special low prices for quick action.

LONE STAR MACHINERY CO.

339 W. 24th St. Chicago 16, Ill.
Tele. DA 6-1500

FOR IMMEDIATE SALE

48" Ingersoll Planer Mill, used Ingersoll 48" x 48" x 18 ft.
Type B Adjustable Rail Milling Machine. Serial 15709 New 1941. Two Swiveling Rail Heads and one R. H. Side Head. Table 42" x 18 Ft. Long. Main Drive 40 HP, 230 Volt DC Motor Generator Set Available also for This Machine.

PRICE: $37,500.00
For Details or Inspection Write, Wire, Call:

STRUTHERS WELLS CORPORATION
TITUSVILLE, PENNSYLVANIA
TELEPHONE 53211

VARIABLE VOLTAGE DRIVES

3 PHASE 60 CYCLE

Quan.	Size	Description
2	3000 HP	DC MOTORS—525 V. 600 RPM Whse. M.G. Sets—2500 K.W. Whse. 2300/4160 V.
1	2750 HP	DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 HP 720 RPM, 2300 V. AC Motor and Etc.
1	2250 HP	DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1	1500 HP	DC MOTOR 600 V. 600 RPM Whse. M.G. Set. 1500 K.W. G.E. 13,200 V.
1	1500 HP	DC MOTOR 600 V. 300/700 RPM Whse. M.G. Set—1500 K.W. G.E. 13,200 V.

For listing of Motors, Generators, Transformers, M.G. Sets, Rectifiers, Mill Motors, etc.
See last week issue.

Write — Phone — Wire

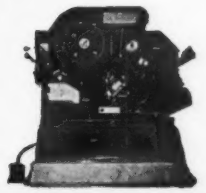
BELYEA COMPANY, Inc.
47 Howell St., Jersey City, N. J.
Tel. Oldfield 3-3334

PRESSES
BRAKES SHEARS

Will Lease or Furnish Long Terms

JOSEPH HYMAN & SONS
2600 E. Tioga St., Philadelphia 34, Pa.

HIGHER CAPACITY
MODERN DESIGN
LOWER PRICE



WITH THE **MUBEA** UNIVERSAL IRONWORKER

Sizes Jr., #0, #½, #1½, #2½
Immediate delivery in your area
Write for brochure and nearest dealer

EHG
E·G·HELLER'S SON INC.
RA 3-8821 7039 E. SLAUSON, L.A. 22, CALIF.

HARCON-LIPSETT LIQUIDATING

at 201 Rover St., Everett, Mass.
500 TON/DAY BLAST FURNACE
108 KOPPERS COKE OVENS
2 PUSHER MACHINES

CARS

800 Cu. Ft. Larry 14'8" Ga. 230V. DC (2)
65 Ton Hot Metal Std. Ga. w/65 Ton Ladles (4)
50 Ton Slag Std. Ga. w/300 Cu. Ft. Ladles (2)
50 Ton Slag Std. Ga. w/260 Cu. Ft. Ladles (2)
50 Ton Transfer Std. Ga. 230V. DC
10 Ton Quenching Std. Ga. 41'6" Wheelbase

OVERHEAD CRANES 230V. D.C.

110 Ton Cleveland Ladle 48'5" Span
20 Ton Shaw 41'7" Span, Cab Oper.
10 Ton Shaw 52' Span, Cab Oper.
10 Ton Bedford ¾ Yd. Bucket 61' Span

ELECTRIC BRIDGE 230V. D.C.

Traveling on Rail, 230' Span, plus 80' Cantilever, 6 Ton Bucket, Single Trolley, Motor Driven

MISCELLANEOUS

Penna. HAMMERMILLS SX13 400HP (3)
Koppers 2 Roll CRUSHER 36"x42", 40 HP
Trimmer CONVEYOR 30"x13'3" c/c Cleated
100 Ton PRINTOMATIC Larry Car SCALE, 14'8" c/c Rail
50 Ton 60' Platform Printomatic TRUCK SCALE
30 Ton 40' Platform Printomatic TRUCK SCALE
CAR HAULS Drum Type 20"x18", 25 HP
SKIP HOIST Lidgerwood 178'
MOTORS, DC Type CO & MD Series & Compound Wound 230V. 1 to 200 HP (100)
MOTORS AC 3/60/440V. Squirrel Cage & Slip Ring 1 to 100 HP (100)

Representative on Premises DUnkirk 9-3380

Write for Catalog

SALES AGENT

HEAT & POWER CO., INC.
60 E. 42 St., N. Y. MUrray Hill 7-5280

LIFTING MAGNETS

A complete magnet service. Magnets, new & rebuilt, generators, controllers, reels, etc.

Magnet specialists since 1910

Goodman Electric Machinery Co.
1060 Broad St. Newark 2, N. J.

The IRON AGE Chestnut & 56th Sts., Philadelphia 39, Pa.

Please send me rates and general information about the Classified Section without obligation on my part.

Name ..... Title .....

Company .....

Street .....

City ..... Zone ..... State .....

I am interested in The Clearing House ☐, Equipment and Materials Wanted ☐, Employment Exchange ☐, Contract Manufacturing ☐.

THE CLEARING HOUSE

BRIDGE CRANES

Shepard Niles 3 ton, top riding, single girder, variable speed, push button floor operated, 37'1" span, 230 volts D.C. or 220/440/3/60 with rectifier. Nine (9) available, excellent condition.

Shepard Niles 10 ton, top riding, double girder, cab operated, variable speed, 37'1" span, 230 volts D.C. or 220/440/3/60 with a rectifier. Four (4) available, excellent condition.

Crane Hoist Engineering Corp.
6515 Salt Lake Avenue
Bell, California
LU 2-7121

Buy CRANES Sell

15-ton, 80' span AC
20-ton locomotive crane Std. Gauge, 60' boom 440/3/60. AC

Specializing in re-engineering and rebuilding overhead traveling cranes and hoists.

HANSON CRANE & ENGINEERING CO.
2425 Lone Tree Rd. — Milford, Mich.
MUtual 4-4055

RR CARS, LOCOMOTIVES, CRANES

25 & 50 Ton Amer. Loco. Cranes
100—70 ton cap. Covered Hopper Cars
400—50 ton cap. Coal & Ore Hopper Cars
28—Diesel Elec. Locomotives 25, 45, 65, 70 80, 100 & 115 ton G.E., GM & Alcoa

STANHOPE, 60 E. 42nd St., N.Y. 17, N.Y

PRECISION GROUND SHAFTING

. . . is better and costs less when Universal supplies it.

Request 16-page catalog ▶

UNIVERSAL GRINDING CORP.
2200 Scranton Rd., Cleveland 13, O.

OFFERING

BRIDGE CRANES

ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

3000/4500 TON BLH HIGH SPEED FORGING PRESS NEW 1954

DIAMETER OF RAM 62"
STROKE OF RAM 40"
2—17" DIA PULLBACKS
MOVING DOWN TYPE
WITH INTENSIFIER
SN S.O.520500-1-2-3
WT. 620,000#

FRACTION OF ORIGINAL COST

POLLOCK INDUSTRIES INC.
S. KEIM ST., POTTSTOWN, PA. FA 3-5500

FOR SALE

22—COLD ROLLING MILLS

1—8" x 4" Standard w. Coilers 25 HP DC Motor
15—8" x 6" Standard w. Coilers 25 HP DC Motor
2—8" x 8" Waterbury-Farrel—25 HP DC Motor
2—8" x 8" Waterbury-Farrel (roll. brg.) 25 HP Motor
2—10" x 10" Blake & Johnson 40/65 HP DC Motor

All Mills with variable speed drives & Coilers, Edge Rollers, etc.

CURRY & HUDSON ASSOCIATES, INC.
ONE GATEWAY CENTER, PITTSBURGH 22, PA.

EMPLOYMENT EXCHANGE

Help Wanted

Salesman, experienced and capable of selling metallurgical products to the steel industry. Would consider a retired but active individual in the Pittsburgh area.

BOX H-183
c/o IRON AGE, Chestnut at 56th, Phila. 39

TECHNICAL SALES-SERVICE MAN, Midwest refractory manufacturer needs young man, with technical background, 5 years' experience in Open Hearth or Electric Furnace shop, to sell and service refractory products for steelmakers in Midwest and South. Good future prospects in expanding business. Give salary requirements and complete resume. Replies held confidential. Box H-181, c/o IRON AGE, Chestnut at 56th, Phila. 39.

Employment Service

HIGH GRADE MEN — Salaries $5,000 to $25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comptrollers, Accountants and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bourse, 220 South State Street, Chicago 4, Illinois.

•

STEEL MILL INDUSTRIAL ENGINEERS

•

METHODS ENGINEERING as well as wage incentive programming experience will qualify you for positions in our Industrial Engineering Department at our Fontana Plant in Southern California.

•

Opportunities available at all levels of experience. Professional status assured. Send complete resume to

•

Personnel Services Dept.

KAISER STEEL CORP.
P. O. BOX 217
FONTANA, CALIFORNIA

•

STEEL MILL PRODUCTION METALLURGISTS

Our Fontana Plant has permanent openings for Production Metallurgists whose qualifications include a minimum of 5 years experience in flat rolled products — plate—hot strip and tin plate or tubular products—continuous butt weld or electric resistance weld pipe.

College degree preferred for these positions.

Send complete resume including salary requirements to:

Personnel Services Dept.

KAISER STEEL CORP.
P.O. BOX 217
FONTANA, CALIF.

EQUIPMENT AND MATERIALS WANTED

WANTED
SURPLUS STEEL
WALLACK BROTHERS
7400 S. Damen Ave. Chicago 36, Illinois
GROVEHILL 6-7474

WEISS STEEL CO. INC.
600 WEST JACKSON BLVD.
CHICAGO 6, ILLINOIS
Buyers of Surplus Steel Inventories
39 Years of Steel Service

WANTED
USED
ROLL FORMING MACHINE

For forming metal ribbed roofing sheets, to accomodate 36" sheet minimum width. Quote giving make, number of stations, Spindles diameter, Girth Opening, roll pitch vertical adjustment and all details and specifications. No tooling required.

BOX H-184
c/o IRON AGE, Chestnut at 56th, Phila. 39

EQUIPMENT AND MATERIALS WANTED

WANTED

Pangborn or Wheelabrator Airless Blasting Machine for continuous cleaning 16 & 18 gauge steel strip approximately 26" to 40" wide. As alternate want blast wheels, elevators and separators to be used in building blasting machine.

ALSO—

400 Volt 60 Cycle 250 KVA mash type welder to weld 12 gauge material 2" wide.

EVANS COOPERAGE CO., INC.
P.O. Box 95 Harvey, Louisiana
FOrest 6-8571

WANTED
BRIDGE CRANES
ARNOLD HUGHES COMPANY
2765 PENOBSCOT BLDG. DETROIT, MICH.
WOodward 1-1894

WANTED FOR EXPORT

Hydraulic Forging Press of approximately 5,000 Tons, 80" stroke, 160" daylight, distance between columns 150" x 90".
Forging Manipulator of approximately 60 Ton capacity. 9 Oil fired bogie hearth Furnaces, size 9' x 24' to 9' x 60'.

STROM MACHINERY CORP.
1818 Summer Street Hammond, Indiana

WANTED
TIN PLATE — STEEL
SHEET—STRIP—COIL
WILLIAM B. LOBL CO.
2526 Bouck Ave. Bronx 69, N. Y.

WANTED TO PURCHASE—any quantity
CARBON—ALLOY—STAINLESS
Bars—Billets—Sheet—Plate
THE GILBERT MERRILL STEEL CORP.
91 New York Ave., Westbury, L. I., N. Y.
EDgewood 3-7300

SURPLUS STEEL
NEW *WANTED* USED
Structurals, Plate, Pipe and Tubing
Consumers Steel & Supply Co.
P. O. Box 270, RACINE, WISCONSIN

CONTRACT MANUFACTURING

DROP FORGINGS
Special Forgings—High Quality, Fast Delivery. For prompt attention phone or send prints to John Bello.
CARCO INDUSTRIES, INC.
7341 Tulip Street, Phila. 35, Pa.
DEvonshire 2-1200

THE FORMULA:

Multi-operation presses
plus
Yankee skilled workmen
over
Eighty years manufacturing
know-how equals
Low cost metal stampings
And precision assemblies
To meet your needs

The GREIST MANUFACTURING CO.
646 Blake St., New Haven 15, Conn.

METAL STAMPINGS
Send your blueprints for our prompt quotation. Latest brochure sent upon request.
CARLSTROM PRESSED METAL CO., INC.
58 Fisher Street Westboro, Mass

DROP FORGINGS
To Your Specifications
Prompt Quotations
BALDT ANCHOR CHAIN & FORGE DIVISION
P. O. Box 350—Chester, Pennsylvania

DROP FORGINGS
Special Forgings of Every Description. We solicit your prints or model for quotation.
Wilcox Forging Corporation
Mechanicsburg Penna.

K
SINCE 1895

DROP FORGINGS
Small drop forgings up to one pound in size. Inquiries invited for very prompt action.
KEYSTONE FORGING COMPANY
Northumberland Pennsylvania GReenwood 3-3525

SPECIFY MEEHANITE® CASTINGS FOR MAXIMUM SERVICE
SPECIAL TYPES FOR RESISTANCE TO ABRASION • HEAT • WEAR • CORROSION
AS CAST OR MACHINED.
Weights: 1—60,000 lbs.
ROSEDALE
FOUNDRY & MACHINE CO.
1721 Preble Avenue • Pittsburgh 33, Pa.
Telephone: CEdar 1-4007

Gray Iron and Semi Steel Castings, also alloyed with nickel, chrome, and molybdenum. Pattern work.
KING FOUNDRIES, INC.
Phone OX-9-4823 North Wales, Montg. Co., Pa.
22 Miles from Philadelphia, Pennsylvania

STAMPINGS — WASHERS
Short Runs All Metals Long Runs
All tools produced in our own tool rooms. Press capacities up to 500 tons.
THOMAS SMITH COMPANY
294 Grove St., Worcester 5, Mass.

DUCTILE IRON CASTINGS
Same-day service on quotes
Dependably prompt delivery
WRITE OR CALL **ALTEN** Foundry & Machine Works, Inc.
Lancaster, Ohio

Nepsco
NEW ENGLAND PRESSED STEEL COMPANY
Contract Manufacturer since 1914
METAL STAMPINGS
SPECIALTIES—APPLIANCES
For Industrial and Domestic Users
P. O. BOX 29
NATICK MASSACHUSETTS

SPECIAL MACHINERY
DIAMITE *Abrasive Resistant* Castings
NI-RESIST *Heat & Corrosion Resistant* Castings
P M G BRONZE *High Strength Acid Resistant* Castings
Fully Equipped—Pattern Foundry & Machine Shop Facilities—Castings to 15 tons
Weatherly Foundry & Mfg. Co., Weatherly, Pa.

ADVERTISERS IN THIS ISSUE

An asterisk indicates that a booklet, or other information, is offered in the advertisement.

This index is published as a convenience. No liability is assumed for errors or omissions.

A

*Acme Steel Co. ... 93
Aircraft Armaments, Inc. ... 185
Air Reduction Sales Co. ... 61, 180
Alan Wood Steel Co. ... 182
*Allegheny Ludlum Steel Corp. ... 6
Allen-Bradley Co. ... 122
Allis-Chalmers ... 74-75
*All-State Welding Alloys Co., Inc. ... 185
Alten Foundry & Machine Works, Inc. ... 203
*Amchem Products, Inc. ... 64-65
American Air Compressor Corp. ... 200
*American Gas Furnace Co. ... 174
American Hot Dip Galvanizers Association, Inc. ... 40
American Metallurgical Products Co. ... 104
American Oil Co. ... 51-60
American Welding & Mfg. Co. ... 152
Anaconda American Brass Co. ... 44
Ansco Div. General Aniline & Film Corp. ... 39
*Armco Steel Corp. ... 158-159
*Armstrong Bros. Tool Co. ... 204
*Associated Spring Corp. ... 76

B

*Babcock & Wilcox Co., Refractories Div. ... 80-81
Baldt Anchor Chain & Forge Div. ... 203
Barnes, Wallace Co., Div. Associated Spring Corp. ... 76
Barnes-Gibson-Raymond, Inc., Div. Associated Spring Corp. ... 76
*Basic, Inc. 161, 165, 169, 173, 177, 181
Bay State Abrasive Products Co. ... 62-63
Belyea Co., Inc. ... 201
Bethlehem Steel Co. ... 1
Blaw-Knox Co., Foundry & Mill Machinery Div. ... 151
Bliss & Laughlin, Inc. ... 29
Branson Instruments, Inc. ... 164

C

Carco Industries, Inc. ... 203
Carlstrom Pressed Metal Co. ... 203
Chemical Construction Corp. ... 10
Cincinnati Milling Machine Co. Cincinnati Milling Products Div. ... 16
Cities Service Oil Co. ... 120
*Coffing Hoist Div. Duff-Norton Co. ... 150
Colorado Fuel & Iron Corp. ... 96-97
Columbia-Geneva Steel Div., United States Steel Corp. ... 26, 72-73
Columbia-Southern Chemicals, Pittsburgh Plate Glass Co. ... 162-163
Commission of Public Docks ... 79
*Conco Engineering Works, Inc. ... 179
Consumers Steel & Supply Co. ... 203
*Copperweld Steel Co., Aristaloy Steel Div. ... Inside Front Cover
Crane Hoist Engineering Corp. ... 202
Crucible Steel Co. of America ... 20
Curry & Hudson Assoc., Inc. ... 202
Cutler-Hammer Inc. ... 30-31

D

*Danly Machine Specialties, Inc. ... 23
Deming Co. ... 185
*Duff-Norton Co., Coffing Hoist Div. ... 150
Dunbar Bros. Co., Div. Associated Spring Corp. ... 76

E

*Elastic Stop Nut Corp. of America ... 38
Erickson Tool Co. ... 98
Erie Engine & Mfg. Co. ... 200
Evans Cooperage Co., Inc. ... 203

F

Fenn Manufacturing Co. ... 28
Foster, L. B. Co. ... 201

G

*Gates Rubber Co. ... 128-129
General Aniline & Film Corp. ... 39
General Electric Co., Industry Control Dept. ... 42-43
Gibson, Wm. D. Co., Div Associated Spring Corp. ... 76
Gilbert Merrill Steel Corp. ... 203
*Gisholt Machine Co. ... 50
Goodman Electric Machinery Co. ... 201
Goodyear Tire & Rubber Co. Industrial Products Div. ... 32-33
Goss & DeLeeuw Machine Co. ... 204
Greist Manufacturing Co. ... 203
Gulf Oil Corp. ... 100-101

H

Hanson Crane & Engineering Co. ... 202
*Hayes, C. I., Inc. ... 19
Heat & Power Co., Inc. ... 201
Heller's Son, E. G. Inc. ... 201
*Hendrick Manufacturing Co. ... 99
Hepburn, John T., Co., Ltd. ... 175
Heppenstall Co. ... 134
Holo-Krome Screw Corp. ... 47
Hughes, Arnold, Co. ... 203
Hussey, C. G. & Co. ... 115
Hyman, Joseph & Sons ... 201

I

Imperial Electric Co. ... 160
*Ingersoll Steel, Div. Borg-Warner Corp. ... 41
International Nickel Co., Inc. ... 35

K

*Kaiser Aluminum & Chemical Corp. ... 8, 70-71
Kaiser-Steel Corp. ... 202
*Kardong Bros., Inc. ... 204
Keystone Forging Co. ... 203
Keystone Steel & Wire Co. ... 171
King Foundries, Inc. ... 203
*Kin Tel Div., Cohu Electronics, Inc. ... 45

L

Lindberg Engineering Co. ... 91
Lobl Co., William B. ... 203
Lone Star Machinery Co. ... 201
Lukens Steel Co. ... 82-83

M

Magnaflux Corp. ... 130-131
*Marchant, Geo. F. Co. ... 178
Midwest Steel Co. ... 94
Miller Co. ... 27
Miller, Harry Corp. ... 12
Morgan Construction Co. ... 24-25

N

National Business Bourse, Inc. ... 202
National Steel Corp. ... 94
National Tube Div., United States Steel Corp. ... 72-73
New England Pressed Steel Co. ... 203
Nicholson File Co. ... 34
Norton Co., Abrasive Grinding Wheel Div. ... 84-85

O

Olin Mathieson Chemical Corp., Metals Div. ... 127
Ornitz Equipment Corp. ... 203
*Osborn Mfg. Co., Brush Div. ... 176

P

Peterson Steels, Inc. ... 187
Pittsburgh Plate Glass Co., Chemical Div., Columbia-Southern Chemicals ... 162-163
Pittsburgh Steel Co., Thomas Strip Div. ... 87-90
Pollock Engineering Co., Inc. ... 21
Pollock Industries, Inc. ... 202
*Porter, H. K. Co., Inc. ... 166-167
*Powermatic Mch. Co. ... 197

R

Raymond Manufacturing Co., Div., Associated Spring Corp. ... 76
*Republic Steel Corp. ... 68-69
Research-Cottrell, Inc. ... 95
*Riverside-Alloy Metal Div., H. K. Porter Co., Inc. ... 166-167
*C. A. Roberts Co. ... 180
Rosedale Foundry & Machine Co. ... 203
Ryerson, Jos. T. & Sons, Inc. ... 14

S

Saint Joseph Lead Co. ... 172
Sandvik Steel, Inc. ... 149
*Salas Corp. of America ... 66-67
Shell Oil Co. ... 155
*Sherritt Gordon Mines Ltd. ... 102
Signode Steel Strapping Co. ... Back Cover
Simonds Saw & Steel Co. ... 48-49
Simoniz Industrial Products Div. ... 86
Smith, Thomas Co. ... 203
Stanhope, R. C. Inc. ... 202
Steel Equipment Co. ... 92
Struthers Wells Corp. ... 201
Strom Machinery Corp. ... 203
Sun Oil Co. ... 124
Swift-Ohio Corp. ... 174
Swindell-Dressler Corp. ... 117

T

*Taylor Fibre Co. ... 168
Tennessee Coal & Iron Div., United States Steel Corp. ... 26
Timken Roller Bearing Co. ... 118
*Trent Tube Co., Subsidiary Crucible Steel Co. of America ... 20

U

United States Steel Corp. ... 26, 72-73
United States Steel Export Co. ... 26, 72-73
United States Steel Supply Div., U. S. Steel Corp. ... 72-73
Universal Grinding Corp. ... 202

V

Vanadium Corp. of America ... 22
Voss Engineering Co. ... 180

W

Wales-Strippit, Div. Houdaille Industries, Inc. ... 77-78
Wallack Bros. ... 202
Wallingford Steel Co. ... 132
Warner & Swasey Co. ... 4
Washington Steel Corp. ... 18
Watson-Stillman Press Div. Farrel-Birmingham Co., Inc. ... 36-37
Wean Engineering Co., Inc. ... 17
Wean Equipment Corp. ... Inside Back Cover
Weatherly Foundry & Mfg. Co. ... 203
Weirton Steel Co. ... 94
Weiss, B. M. Co. ... 201
Weiss Steel Co. Inc. ... 202
*Welded Steel Tube Institute ... 46
Wheland Co. ... 175
Whisler Equipment Co. ... 200
*White, S. S., Industrial Div. ... 157
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. ... 95-97
Wilcox Forging Corp. ... 203

Z

Zak Machine Works, Inc. ... 178

CLASSIFIED SECTION

Clearing House ... 200-202
Contract Manufacturing Appears in first and third issue of each month. See ... 202-203
Employment Exchange ... 203
Equipment & Materials Wanted ... 202

KARDONG CIRCLE BENDER

For Concrete Reinforcing Bars

This is a powerful and fast machine for heavy duty work in both fabricating plants or in the field where large tonnage is required. It will handle as high as 20 tons a day. Circles of any size required in concrete reinforcing work from 18 inches in diameter up can be bent on this machine. It will bend bars with two or more radii on the same bar without stopping the machine.

Made in two sizes,
Model "C" Capacity 1¼ inch
Model "CA" Capacity 1 inch

Write for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, INC.
MINNEAPOLIS 13, MINN.

GOSS and DE LEEUW

MULTIPLE SPINDLE
CHUCKING MACHINES
Tool Rotating
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

New ARMSTRONG *Adjustable Step Block*

ARMSTRONG Adjustable Step Blocks provide safe, rigid, easily adjustable support for setting-up work. Eliminate haphazard set-ups, save time and labor.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
5209 Armstrong Ave., Chicago 30, U.S.A.

Write for Catalog showing complete System of Armstrong Set-Up and Hold-Down Tools.

Ernst cuts steel costs to customers up to 10% with three new Wean Coil Processing Lines

Jim Moon, sales engineer of McKay Machine (above left), represents Wean Equipment Corporation in the Buffalo area. During a recent call on Ernst Iron Works, Division of Ernst Steel Corporation, Jim talked with Carl Grosse, Plant Superintendent, about the three Wean coil processing lines recently installed by this major metals warehousing firm.

According to Mr. Grosse, the Wean slitting, shearing and coil banding lines have reduced Ernst's handling, labor and scrap costs up to 10%. In addition to providing lower costs to Ernst's customers, this modern coil processing system helps this firm give fast service while easing inventory and supply problems through the purchase of standard size coils.

Equipped with modern, automatic controls, the Wean coil processing lines are operated by only four men and can handle 20,000 lb. coils, up to 54" wide and from .015" to .135" thick.

The McKay Machine Company, sales representatives for Wean Equipment Corporation to the metalworking and warehousing industries, will be able to assist you with complete engineering and technical information in planning your slitting and shearing requirements. Why not contact a McKay sales engineer to see how Wean coil processing equipment can help lower your costs.

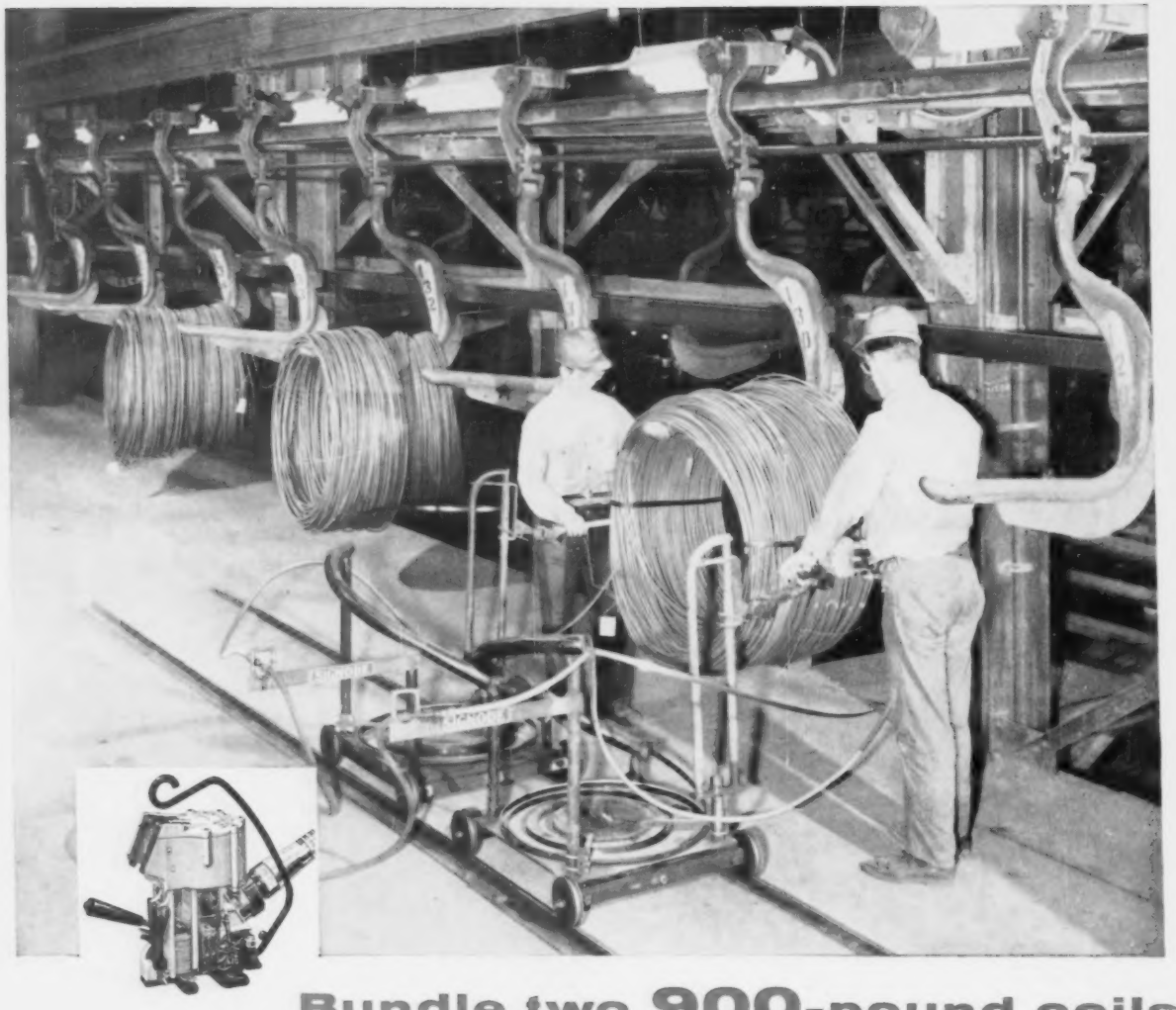
THE McKAY MACHINE COMPANY REPRESENTS WEAN EQUIPMENT CORPORATION IN SALES TO THE METAL FABRICATING AND WAREHOUSING INDUSTRIES

McKAY MACHINE

THE McKAY MACHINE COMPANY
Youngstown 1, Ohio

WEAN

WEAN EQUIPMENT CORPORATION
Cleveland 17, Ohio



Bundle two 900-pound coils on moving conveyor in 30 seconds

Two operators—each using a Signode AMP all-power strapping tool and working in unison—put two steel straps around two 900-pound coils of green rod in 30 seconds!

This setup, which permits making full use of the speed of the AMP, was developed by the manufacturer. It incorporates a mobile strapping station that rolls on tracks paralleling the conveyor line. As the operators work, they move along with the conveyor hook that holds the two coils being strapped. When the strapping operation is completed, they move back to the starting point...30 seconds later. Coils are compressed 30% by the strapping.

The Signode AMP is compact, well-balanced, weighs only 22 pounds. Press a trigger and air power tensions the strapping; press another and air power seals and cuts off the strapping from the coil. The AMP uses new, easy-loading NESTACK seals, which come in nested stacks that eliminate waste and delay. The tool is available for ⅝" and ¾" strapping, .015" to .035" gauge. Special high-tension models are available.

Let us send you additional information on the Signode AMP tool, or, if you prefer, call the Signode man near you.

First in steel strapping

SIGNODE

STEEL STRAPPING CO.

2623 North Western Avenue • Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto